

**SAGASCO RESOURCES LIMITED AND  
SHELL DEVELOPMENT (AUSTRALIA) PTY. LTD.**

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**SITE SURVEYS IN THE BASS STRAIT**

**JUNE 1992**

**KING #1 FLINDERS #1 WILD DOG #1**

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DEVELOPMENT (AUSTRALIA) PTY LTD

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AND SHELL DEVELOPMENT  
(AUSTRALIA) PTY. LTD.**

**SITE SURVEYS IN THE BASS  
STRAIT JUNE 1992  
KING #1  
FLINDERS #1  
WILD DOG #1**

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**July 1992**

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**EXECUTIVE SUMMARY**

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**1.0 EXECUTIVE SUMMARY**

During the month of June 1992, three site surveys were performed in the Bass Strait. Two of the sites, King #1 and Flinders #1 were carried out for Sagasco Resources Limited (Sagasco) and one site, Wild Dog #1, was for Shell Development (Australia) Pty Ltd (Shell).

BHP Engineering were contracted by Sagasco Resources Limited to supply personnel to oversee the work carried out by the survey contractor, Associated Surveys International.

This report outlines the events and discusses the performance of the contractor, vessel and suggests improvements to the operation for future reference.

Seabed bathymetry and side scan sonar recordings were taken at all sites along with gravity drop cores. At the King #1 site, an acoustic array consisting of four seabed transponders was deployed and calibrated.

The primary navigation system was Differential GPS. Corrections were broadcast via an HF radio modem link from a shore base station to the survey vessel. Position was recorded in AGD 84 co-ordinates.

All work was completed satisfactorily although there were some delays caused by weather and survey equipment.

The survey vessel "MV Derwent Enterprise" provided an adequate survey platform although there were initial problems with equipment and provisions.

The survey and marine crews all performed their duties in a professional manner. No complaints were forthcoming from either side. However, it is thought that both the marine and survey personnel were let down to some extent by their respective land based offices in terms of preparation for the job.

**2.0 EQUIPMENT****2.1 CONDITION**

Associated Surveys (ASD) equipment was in good condition with some brand new equipment used for this project. Apart from the DGPS link, all equipment performed satisfactorily, except for the points raised below.

**2.2 PERFORMANCE**

The Differential GPS link was slow to update at times (usually early mornings before sunrise). This could have been due to rain squalls or to the distance of base station from sites (the base station was situated NE of Melbourne in anticipation of extra work in eastern Bass Strait). The minimum update time for the DGPS link was 5 seconds whilst the maximum rate sometimes exceeded five minutes, which is far in excess of the specifications and can lead to large errors in position.

**2.3 SOFTWARE**

ASI used proprietary software called PCNAV. PCNAV is a PC based system which interfaces to most hydrographic surveying sensors and provides data in real-time for navigation. The system was interfaced to GPSWIN to handle the GPS and differential GPS data.

PCNAV and GPSWIN are both excellent packages, however GPSWIN tended to "crash" quite often with no apparent reason for doing so. The fact that this occurred so frequently proved very frustrating. This resulted in lines having to be aborted, the vessel circle and the line restarted resulting in lost time.

**3.0 PERSONNEL****3.1 ASSOCIATED SURVEY PERSONNEL**

All ASI personnel on board performed their duties in a professional manner and deserve recognition for their efforts. Although a 12 hour day was specified in the contract, much longer hours were worked due to equipment problems, weather and observation periods which were, in the main, out of their control.

Following the weather downtime period, and at the request of Sagasco, productive hours were divided into two periods, the first from approx 03:00 hrs to 14:30 hours and the second from approx 19:00 hrs to 21:30 hours. Manning was split between the four on board with a large degree of overlap. These hours were worked in a fashion for the remainder of the project as it was recognised by ASI that the DGPS link was not performing at its optimum.

Agreement on the re-running of lines, which were marginally out of specifications and with allowing lines which were marginal in terms of quality which was necessary at the Flinders #1 site due to time constraints was mutually agreed onboard.

**3.2 MARINE CREW**

The marine crew of the vessel were keen to help when required. It did appear as if manning levels were excessive but we were advised that the boat sailed with the required numbers on board. When asked to continue survey operations due to weather downtime and GPS observation schedules, the crew co-operated willingly.

#### 4.0 SURVEY VESSEL

##### 4.1 GENERAL

The accommodation onboard was very comfortable. The bridge area where the equipment was set up was small, but adequate for this project. If a sub bottom profiling system were also to be used on a project, then it would have made the bridge area too cluttered. An alternate location was available to set up in a disused freezer room forward of the main engine room. Whilst an adequate area, the fact that there was no view to the outside would prove to be an inconvenience.

The vessel was found to be a suitable vessel from which to carry out survey work. It was able to steam at a suitability slow speed and still keep steerage. The height of the back deck above water level could prove difficult in the deployment and recovery of equipment but does give a suitability dry deck during adverse sea conditions.

The initial store of dry provisions ran out within the first four days, which indicates poor planning on behalf of the vessel operators.

##### 4.2 BREAKDOWNS AND MALFUNCTIONS

The following marine equipment was found to be unserviceable during this project.

- Main HF Radio - Could not tune up on greater than 8 megs.  
This should be repaired before vessel chartered again.
- Outboard motor - Initially would not engage in gear.
- Propeller clutch - not operational
- Decca Radar - Not operational.
- VHF radio set - Intermittent operation.
- Free fall winch - Not supplied.
- Crane - Sheave frozen to spindle which made crane operation dangerous until the problem was rectified.
- Auto Pilot - Malfunctioned.

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**SURVEY VESSEL**

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Whilst the boat was successful in provision of the survey platform for this project, it was felt that this project was a test bed for the vessel and the project was used to sort out the defects with the vessel which are inevitable after a long lay-up.

**5.0 DELAYS****5.1 WEATHER**

Contrary to original thoughts the weather did not cause a great deal of delay in the project. A total of two days total during the whole project were lost to weather. Some of this time was spent re-stocking the ship's supplies of dry goods which were running out at the time (only after 4 days at sea). For the rest of the project, we experienced good weather with seas between 0.5 - 2.5 metres.

**5.2 EQUIPMENT**

By far the most frustrating aspect of the job was not being able to start or continue survey due to the poor update rate for the DGPS link. The DGPS is the weakest component in any GPS system and as seen on this project, if it is not capable of 24hr coverage then it can cause delays and/or restrict workable hours. Other systems are available that are capable of operating better than the one used on this project, but it is still always advisable to insist that the monitor station is as close to the working area as possible and to ask contractor to prove efficiency of link prior to commencement of project. Distances in excess of 300km should be avoided if possible.

The link suffered severely from atmospheric propagation effects during the early morning with update rates greater than five minutes at times. This problem was mainly evident at the two remote locations, Flinders #1 and the Shell Wild Dog #1. During daylight hours, the link performed within specification.

There were no major delays attributable to other survey equipment.

Delays caused by the ship's equipment are mentioned under the heading of Survey Vessel.

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**CALIBRATION OF ACOUSTIC ARRAY**

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**6.0 CALIBRATION OF ACOUSTIC ARRAY**

A Sonardyne acoustic array was deployed and calibrated on 16th and 17th June 1992 at the King 1 site in SAGASCO Permit T/18 P.

Four Sondardyne Compatts were deployed from the stern of the vessel, each attached to approximately 100 Kg of concrete weights. Compatt Nos.112 and 313 were deployed using Stand Alone GPS for positioning. Corrections from the Base Station were subsequently restored and Compatt 410 and 109 were positioned using Differential GPS.

Calibration of the array was undertaken in two parts, firstly the relative calibration involving measurement of all inter-transponder seabed baselines and secondly an absolute calibration to tie the array to a known coordinate framework. Baseline measurements were made between 1520 hrs and 1605hrs on 16th June 1992 each baseline being measured in both directions and a mean value derived from a set of 10 observations.

Arbitrary coordinates were given to one transponder and relative coordinates computed for the other transponders based on a speed of sound in water of 1600.4m/s at 72m water depth. This value was obtained from a SVP16 velocity dip taken at 0430hrs on 16th June. The adjustment revealed residuals of less than 1 metre on all baselines, thus demonstrating a strong internal consistency of the baseline observations.

The absolute calibration involved "box-in" observations around 3 Compatts, Nos.313, 109 and 410. A repeat box-in was carried out on Compatt No.313 to provide a check on the observations. Each box-in involved steaming a circle around the selected transponder measuring the acoustic range and simultaneous DGPS position. Observations were carried out between 0938hrs and 1145hrs on 17th June 1992. The offset from the GPS antenna to dunking transducer, mounted on the echo sounder bracket on the starboard side of the vessel, was accounted for using the known aft/stbd offset and calculated CMG for vessel heading. The CMG was seen to lag behind actual heading by up to 10 degrees, introducing a maximum

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**CALIBRATION OF ACOUSTIC ARRAY**

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error of approximately 3m. By obtaining an even spread of data around the transponder this potential error was reduced.

The circles steamed were satisfactory and produced sufficient data for processing the box-ins using the ASI survey programs CALIB and ADJUST to compute a least squared adjusted position for each boxed-in transponder. The two separate box-ins of Compatt No.313 produced an agreement within 1 metre.

At least squares adjustment was then undertaken for the array, holding the boxed-in coordinate of Compatt No.313 and calculated bearing to Compatt No.410 as fixed and using all seabed baseline measurements. An SVP16 velocity dip was carried out at 1420hrs on 16th June and a speed of sound of 1502m/s determined for Compatt water depth. This value was used in the adjustment to convert baseline observations in milliseconds to distance in metres. The adjusted coordinates of the transponders were compared to the respective boxed-in coordinates of Compatt Nos. 410 and 109 and an agreement of better than 5 metres was noted.

To verify the array calibration the vessel was positioned at the centre of the array and during a period of good DGPS comparisons were made between positions computed by the two systems. Vessel heading was manually input to the computer to try and ensure the offset computations between the two systems was correct for comparison fixes. Position differences as computed by acoustics and DGPS were of the order of 3-5 metres and the calibration accepted as satisfactory.

The final coordinates for the Compatts at King 1 are as follows:

COMPATT 313	373431.020 E	5617247.040 N
COMPATT 112	372267.171 E	5617295.242 N
COMPATT 410	372194.762 E	5616134.997 N
COMPATT 109	373420.729 E	5614998.048 N

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**RECOMMENDATIONS**

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**7.0 RECOMMENDATIONS****7.1 SURVEY EQUIPMENT AND PROCEDURES**

As discussed in the previous section the monitor station should be readily accessible to the operator and should be situated as close as possible to the survey area. Siting the monitor station any further away means that the equipment is being asked to perform under unnecessary conditions.

A detailed observation schedule for DGPS should be prepared prior to mobilisation, in order that suitable working periods can be highlighted. In this instance the degradation of the DGPS link during night-time would have to be taken into consideration and the work planned accordingly. Although the contract states a 12 hour working day, this 12 hours should be planned to make optimum use of the GPS and should this not be possible due to contractors equipment failure then it is their responsibility to make every effort to achieve 12 hours production per day.

Alternately, the contractor must prove under field conditions, the operability of the navigation system (at their cost). In doing this, monitor stations can be re-sited or the client can ask for a different system in order that the system becomes 100% operational.

The use of a remote control switch and a cable counter for the SSS winch should be standard equipment when carrying out side scan sonar work. This enables the accurate setting of fish height from the survey room during survey and line changes. It also enables instant recovery of cable if the fish is seen to be getting too close to the seabed. If not standard equipment then it should be requested on all subsequent projects.

Use of the TSS Heave Compensator on the echo sounder produced a "cleaner" sounding record and permitted work in times of large swell. This should also be included in future specifications, particularly when working in this area, where swell is almost constantly present.

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**RECOMMENDATIONS**

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ASI should investigate the cause behind the system "crashes" of GPSWIN with the view to eliminating this frequent problem.

If more site surveys are planned for this area, then the use of a radio navigation system such as Syledis could be considered. The use of such a system would increase the available working period to 24hrs per day. Great care would have to be taken in the siting of the land based stations. Whilst this would require more survey personnel onboard and onshore, the savings in boat time may offset this cost.

It is suggested that more detail is included in the contract with regard to the definition of weather and equipment downtime. In particular the occurrence of both at the same time. Additional exactly what is chargeable and what is not, equipment, personnel, vessel.

## **7.2 SURVEY VESSEL**

If possible the marine crew should have some experience of working on survey projects, if possible. In the past this has resulted in a much faster start up to the project. Both the captain and mate should be experienced in running survey lines. If they are not then valuable time can be wasted in teaching this and can result in lines having to be re-run due to the off-line exceeding the specifications.

The contract should specify that the contractor's personnel may be required to work in excess of the 12 hour day in certain instances.

Although an on-hire survey was carried out on the vessel prior to sailing, certain equipment was found to be unserviceable and it is questionable whether the vessel should have sailed prior to certain items being repaired.

A clause for vessel equipment downtime should be specified in the Contract, and should state what, if any, of the survey equipment and personnel are chargeable during this time.

Drop coring proved to be a very time consuming task. This was due to the lack of a free falling winch, and the tolerances requested for the drop positions. Although

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**RECOMMENDATIONS**

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ASI were assured of a free fall winch on the vessel, no winch was available. In future the contract should state that the drop coring must be performed using a suitable free-fall winch. This is not only less time-consuming but also considerably safer. In order to position the vessel to the accuracy required to obtain cores at the locations requested it is almost impossible without a four-point mooring system. Unless the survey is for a jack-up rig then core locations could possibly be taken in areas of different sonar reflectivity (i.e different seabed material) and in the general vicinity of the proposed location. This does not require so much manoeuvring and therefore reduces time.

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**SUMMARY OF EVENTS**

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**8.0 SUMMARY OF EVENTS***03 JUNE 1992*

- 00:00 Standing by.
- 08:00 Contacted Jo Miller DNV to advise of delay in departure of vessel.  
JM advised he had to go to Hobart 4th 5th June.  
Contacted MR to advise problem.
- 09:40 Tried to contact ASI at Hotel - no luck  
JM rang to say boat to take bunker and will need to do survey ASAP.  
Advised RM of situation.  
Contacted ASI on boat.  
JM and JR to boat for on hire survey
- 10:45 Arrived boat. ASI mobilising equipment  
Met with Captain and JM and commenced on hire survey.  
No current papers for vessel available for viewing.  
Virtually nil fuel on board  
Unable to get accurate recent engine running times
- 17:00 Returned Hotel and advised MR of daily activities.

*04 JUNE 1992*

- 00:00 Standing by.
- 08:30 Contacted by Rob Ray (Captain) departure of vessel and  
need to get crew organised.
- 17:00 Returned Hotel and advised MR of daily activities.

*05 JUNE 1992*

- 00:00 Standing by.  
Associated Surveys still mobilising equip.  
Advised SSS fish not arriving until Saturday AM.
- 15:00 Safety briefing
- 16:30 Departed vessel. Fuel still not arrived.
- 17:00 Returned Hotel and advised MR of daily activities.

## SUMMARY OF EVENTS

*06 JUNE 1992*

00:00 Standing by.  
 10:00 Contacted by PC re SSS fish.  
 PC to go to airport to pick up at 13:00.  
 11:00 Checked out of hotel and went to boat.  
 14:30 PC returned with SSS fish.  
 checked function of fish  
 17:45 Pilot onboard  
 18:00 Dropped lines and departed Vic dock.  
 18:15 Advised MR of departure from Port Melbourne.  
 23:59 Enroute to King #1.

*07 JUNE 1992*

00:00 Enroute to King #1.  
 05:30 Crossed Permit area boundary for King #1.  
 07:30 Arrived King #1 location  
 GPS appears to be functioning OK, however, calculated height too far out. Decided not to use GPS until data looks OK. ASI marking SSS cable @ 25m intervals  
 09:30 Contacting Base station for report on situation there.  
 10:15 GPS good again. No explanation for strange behaviour.  
 11:10 Velocity profile dip  
 Velocity calculated to be 1503 m/sec.  
 11:40 Deploying E/S pole and transducer  
 Adjusting and tuning equipment.  
 14:00 Commenced running cross line  
 14:50 GPS observing session finished  
 23:59 Standing by.

PRODUCTION	TRAVEL	WEATHER	DOWN	EXTERNAL
NIL				02:45

*08 JUNE 1992*

00:00 Standing by for useable satellite period.  
 01:00 Weigh anchor.

## SUMMARY OF EVENTS

03:30 SOL K16  
03:49 EOL K16  
Line to be re run due to off-line distance  
No sonar contacts - E/S flat  
Circling for line K13  
04:00 SOL K13  
04:10 Line aborted - loss of DGPS signals from base station  
Contacted base station - computer lockup  
04:17 DGPS back on line  
04:44 SOL K10  
05:00 Line aborted - high PDOP value  
Circling for line K7  
05:27 SOL K7  
05:35 K7 aborted due to loss of DGPS updates  
Circling for line K4  
05:54 SOL K4  
06:12 EOL K4  
Circling for line K1  
06:20 SOL K1  
06:38 EOL K1  
Circling for line K3  
06:54 SOL K3  
06:56 K3 aborted - off-line distance too great  
Circling for line K3A  
07:14 SOL K3A  
07:32 EOL K3A  
Circling for line K6  
07:41 SOL K6  
07:59 EOL K6 - 3 SV's used for last part of line  
08:08 SOL K9  
08:10 K9 aborted due to GPS computer crash  
08:32 SOL K9A  
08:52 EOL K9A  
09:20 SOL K12  
09:39 EOL K12

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**SUMMARY OF EVENTS**


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10:05 SOL K15  
 10:22 EOL K15  
 10:37 SOL K18  
 10:54 EOL K18  
 11:08 SOL K21  
 11:27 EOL K21  
 11:41 SOL K24  
 11:57 EOL K24  
 12:19 SOL K27  
 12:37 EOL K27  
 12:51 SOL K30  
 13:08 EOL K30  
 13:24 SOL K29  
 13:43 EOL K29  
 13:55 SOL K26  
 13:57 K26 aborted due to poor nav.  
 14:14 SOL K26A  
 14:30 EOL K26A - last 10 mins run with three SV's.  
 The SSS and E/S traces showed a flat featureless bottom. No  
 significant events were recorded on either trace.  
 23:59 Standing by at location.

PRODUCTION	TRAVEL	WEATHER	DOWNTIME	EXTERNAL
10:53	NIL	NIL	01:07	NIL

King #1

Lines surveyed = 10,4,1,3A,6,9A,12,15,18,21,24,27,30,29,26A

Sub Total = 15

Total = 15

*09 JUNE 1992*

00:00 Standing by for useable satellite period.  
 02:30 Weigh anchor.  
 03:15 All equipment prepared for commencement of lines  
 DGPS failing to update corrections  
 Contacted base station to try to sort out problem.

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**SUMMARY OF EVENTS**

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Tried different frequency (4Megs) but still no good.  
04:30 Running into line K2 - Problem with autopilot - line approach aborted.  
04:49 SOL K2  
05:08 EOL K2  
Circling for line K5  
05:20 SOL K5  
05:39 EOL K5  
Circling for line K8  
05:51 SOL K8  
06:05 EOL K8 - last 1000m to be re run  
Circling for line K11  
06:25 SOL K11  
06:47 EOL K11  
Circling for line K14  
07:03 SOL K14  
07:22 EOL K14  
Circling for line K17  
07:34 SOL K17  
07:53 EOL K17  
Circling for line K20  
08:08 SOL K20  
08:11 K20 aborted due to poor nav.  
Circling for line K20A  
Line 20A aborted due to program (computer) crash  
Circling for line K20B  
09:22 SOL K20B  
09:43 EOL K20B  
Circling for line K23  
10:02 SOL K23  
10:21 EOL K23  
Circling for line K31  
10:34 SOL K31  
10:57 EOL K31  
Circling for line K238

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**SUMMARY OF EVENTS**


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11:15 SOL K28  
 11:33 EOL K28  
         Weather deteriorating  
         Circling for line K25  
 11:47 SOL K25  
 12:10 EOL K25 - line finished 200m short due to computer crash.  
         Circling for line K22  
 12:30 SOL K22  
 12:33 K22 aborted - high RMS with GPS  
         Circling for line K22A  
 12:51 SOL K22A  
 13:09 EOL K22A - trouble holding line  
         Sounding data becoming very poor  
 13:15 Operations ceased due to weather conditions  
         Retrieved SSS and brought E/S transducer inboard.  
 14:00 Radphone to Mike Renison to advise progress and situation.  
 18:00 Decided to head for Stanley on northern Tasmanian coast.  
 23:59 Steaming slowly for Sawyer Bay off Stanley.

PRODUCTION	TRAVEL	WEATHER	DOWNTIME	EXTERNAL
08:19	06:00	01:15	02:26	NIL

King #1

Lines surveyed = 2,5,8,11,14,17,20B,23,31,28,25,22A

Sub Total = 12

Total = 27

*10 JUNE 1992*

00:00 Steaming slowly for Sawyer Bay off Stanley.

02:00 Arrive Sawyer Bay and drop anchor.

        Standing by for weather

        Contacted Mike Renison to advise situation.

        Contacted Simon Dykes to advise situation.

        Captain advised that dry stores are low and need to be replenished.

        Making ready dinghy to go ashore.

## SUMMARY OF EVENTS

15:00 Outboard motor an dinghy could not be put into gear.  
 Bought back onboard for repair by Engineers.  
 Too late to go ashore for stores.

23:59 At anchor in Sawyer Bay.

PRODUCTION	TRAVEL	WEATHER	DOWNTIME	EXTERNAL
NIL	02:00	22:00	NIL	NIL

King #1  
 Lines surveyed = 0  
 Total lines surveyed = 27

*11 JUNE 1992*

00:00 At anchor in Sawyer Bay off Stanley.  
 Standing by for weather.

09:00 Dinghy in water for trip to Stanley.  
 Broke shear pin on prop. Dinghy back on board for repairs.

10:00 Captain and members of boat ashore to get supplies.

13:30 Contacted Mike Renison to advise situation. Not available

14:30 Contacted by MR - advised situation.

15:30 Captain and members return with supplies.  
 Contacted Bureau of Met. regarding weather situation.  
 Advised 3-4m swell with 30 knot winds for 12/6/92  
 Easing on Saturday  
 Contacted MR to advise.  
 Agreed to sail for Flinders #1 to be there for first  
 satellites on Friday morning.  
 Advised Captain.

22:30 Weigh anchor and depart for Flinders #1 location.

23:59 Slowly steaming for Flinders #1 site.

King #1  
 Lines surveyed = 0  
 Total lines surveyed = 27

## SUMMARY OF EVENTS

*12 JUNE 1992*

00:00 Steaming slowly for Flinders #1 location.  
 01:30 Arrive Flinders #1.  
 20 - 30 knot winds, Seas 2 - 3 metres at 3 seconds.  
 Ran up navigation software to check if possible to run survey lines.  
 @ 070° (with weather) able to hold line OK. Speed 6 knots at clutch  
 ahead. Smooth ride. @ 250° (into weather) able to hold line  
 (wandering). Speed 4 knots clutch ahead. Rough ride as beating  
 into seas. Unable to safely deploy echo sounder transducer.  
 Running lines @ 160/340° not possible as seas directly on beam.  
 03:45 Advised Captain to return Stanley @ economical speed.  
 07:30 Arrived Stanley and anchoring.  
 08:30 Telephone call to Simon Dykes.  
 09:00 Telephone call to Mike Renison.  
 Standing by for weather  
 23:59 At anchor in Sawyer Bay.

PRODUCTION	TRAVEL	WEATHER	DOWNTIME	EXTERNAL
NIL	01:30	22:30	NIL	NIL

## King #1

Lines surveyed = 0

Total lines surveyed = 27

*13 JUNE 1992*

00:00 Enroute to Flinders #1.  
 03:15 Arrived King #1 location  
 03:40 Managed to deploy E/S transducer  
 03:59 Velocity profile dip  
 Velocity calculated to be 1502 m/sec.  
 04:30 Preparing run in for first line  
 GPS not updating line approach aborted.  
 05:54 SOL F44  
 06:14 EOL F44. No DGPS corrections 05:59 - 06:13, line should be re  
 run if time permits.

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**SUMMARY OF EVENTS**

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06:33 SOL F43  
06:51 EOL F43  
07:07 SOL F42  
07:27 EOL F42  
07:38 SOL F41  
07:56 EOL F41  
08:10 SOL F40  
08:29 EOL F40  
08:43 SOL F39  
09:01 EOL F39  
09:14 SOL F38  
09:33 EOL F38  
09:48 SOL F37  
10:05 EOL F37  
10:18 SOL F36  
10:24 EOL F36 - line aborted due to poor DGPS updates.  
10:51 SOL F36A  
11:09 EOL F36A  
11:22 SOL F35  
11:39 EOL F35  
11:50 SOL F34  
12:09 EOL F34  
12:22 SOL F33  
12:40 EOL F33  
12:53 SOL F32  
13:11 EOL F32  
13:22 SOL F31  
13:41 EOL F31 - fixes 1688-1706 no good. EOL fix = 1710 and  
still on line. Line may be re run as low priority.  
13:54 SOL F28  
14:12 EOL F28 - last part of line run on 3 sats.  
End of useable GPS for this session.  
Recover equipment.  
14:35 At anchor at location.  
Standing by for next satellite period.

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SUMMARY OF EVENTS

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18:05 Weigh anchor, deploy fish and wait for good GPS.  
19:32 SOL F25  
19:50 EOL F25 - first 1000m to be re run as no corrections.  
20:03 SOL F22  
20:14 EOL F22 - line aborted - printer hangup.  
20:29 SOL F22A  
20:43 EOL F22A  
20:55 SOL F19  
21:13 EOL F19  
21:27 SOL F16  
21:30 EOL F16 - line stopped early due to no corrections.  
21:38 Base stopped sending corrections.  
22:00 Vessel at anchor at location  
23:59 Standing by.

## Flinders #1

Lines surveyed = 42,41,40,39,38,37,36A,35,34,33,32,31,28,22A,19,

Sub Total = 15

Total = 15

PRODUCTION	TRAVEL	WEATHER	DOWN	EXTERNAL
12:33	03:15	NIL	00:42	00:00

*14 JUNE 1992*

00:00 At anchor at Flinders #1.  
05:00 Weigh anchor  
05:40 Deploy SSS fish.  
05:22 SOL F13  
06:10 EOL F13.  
06:25 SOL F10  
06:42 EOL F10  
06:53 SOL F7  
07:11 EOL F7  
07:21 SOL F4  
07:38 EOL F4

---

**SUMMARY OF EVENTS**

---

07:50 SOL F1  
08:05 EOL F1 - stopped 200m short of EOL due to jump in GPS of  
13km GPS non useable whilst USDOD plays around with it.  
10:08 GPS appears OK  
10:30 SOL F2  
10:47 EOL F2  
10:59 SOL F5  
11:16 EOL F5  
11:29 SOL F8  
11:47 EOL F8  
11:59 SOL F11  
12:16 EOL F11  
12:28 SOL F14  
12:42 EOL F14  
12:57 SOL F17  
13:08 Line F17 aborted due to GPS Windows Crash  
13:32 SOL F17A  
13:43 Line F17A stopped 1000m short of EOL due to GPS position  
showing 28km jump. Observations ceased. Retrieved equip.  
14:04 At anchor at location waiting for next GPS session.  
19:10 Contact Base Station operator.  
19:15 Weigh anchor, deploy fish and wait for good GPS.  
19:45 Still no corrections. Rest GPS computer due to crash  
19:59 SOL F9  
20:18 EOL F9  
20:31 SOL F12  
20:49 EOL F12  
21:03 SOL F15  
20:18 EOL F15  
21:31 SOL F18  
21:35 EOL F18 - line stopped as too few satellites  
21:36 Base station ceased sending corrections.  
21:55 Vessel at anchor at location  
23:59 Standing by.

---

SUMMARY OF EVENTS

---

PRODUCTION	TRAVEL	WEATHER	DOWNTIME	EXTERNAL
10:29	NIL	NIL	01:13	02:35

Flinders #1

Lines surveyed = 13,10,7,4,1,2,5,8,11,14,17A,9,12,15

Sub Total = 14

Total = 29

*15 JUNE 1992*

00:00 At anchor at Flinders #1.

02:30 Paul Caswell checking update rate for DGPS signals.  
Not adequately fast for survey.

05:00 Weigh anchor

05:20 Deploy SSS fish.

05:35 SOL F21

05:53 EOL F21

06:04 SOL F24

06:21 EOL F24

06:36 SOL F27

06:38 EOL F27 line aborted as nav very jumpy

06:54 SOL F27A

07:11 EOL F27A

07:31 SOL F30

07:47 EOL F30

08:03 SOL F29

08:09 EOL F29 line aborted due to computer crash.

08:13 SOL F29

08:20 EOL F29

08:35 SOL F26

08:51 EOL F26

09:03 SOL F23

09:21 EOL F23

09:33 SOL F20

09:51 EOL F20

10:04 SOL F18

---

**SUMMARY OF EVENTS**


---

10:21 EOL F18  
 10:35 SOL F6  
 10:52 EOL F6  
 11:01 SOL F3  
 11:19 EOL F3  
 Observations ceased.  
 11:25 Retrieved equip.  
 Set up for drop coring  
 12:31 1st core 17m from location approx 1.2m long  
 13:19 2nd core 39m from location approx. 1.2m long  
 Pack up drop core equip.  
 13:50 At anchor at location waiting for next GPS session.  
 18:45 Weigh anchor, deploy fish and wait for good GPS.  
 19:10 Contact Base Station operator.  
 19:47 SOL F16A  
 19:58 EOL F16A  
 20:08 SOL F17B  
 20:20 EOL F17B  
 20:33 SOL F29A  
 20:41 EOL F29A  
 20:53 SOL F25A  
 21:01 EOL F25A  
 21:13 SOL F33A  
 21:23 EOL F33A  
 21:30 Retrieved SSS fish and pulled down E/S transducer pole.  
 Underway to King #1 location.  
 23:59 Steaming to King #1 location.

PRODUCTION	TRAVEL	WEATHER	DOWNTIME	EXTERNAL
10:43	NIL	NIL	01:32	NIL

---

**SUMMARY OF EVENTS**

---

## Flinders #1

Lines surveyed = 21,24,27A,30,29,26,23,  
20,18,6,3,16A,17B,29A,25A,33A  
Sub Total = 16  
Total = 45

*16 JUNE 1992*

00:00 Enroute to King #1.  
01:30 N Smith checking update rate for DGPS signals.  
03:00 Arrive King #1  
03:15 Deploy E/S transducer and SSS fish.  
Running into first line  
03:28 DGPS signals lost - Base station crash  
04:30 Velocity dip 1500.17 m/sec.  
04:55 Corrections restored.  
Running into first line - Auto Pilot not functioning  
05:33 SOL K22  
05:35 EOL F22 aborted due to auto pilot  
07:25 SOL K22  
07:43 EOL K22  
07:54 SOL K19  
08:11 EOL K19  
08:24 SOL K16  
08:41 EOL K16  
08:53 SOL K13  
09:11 EOL K13  
09:20 SOL K8A  
09:27 EOL K8A  
09:31 SOL K10A  
09:38 EOL K10A  
09:46 SOL K7A  
10:03 EOL F7A  
Observations ceased.  
10:15 Retrieved equip.  
Set up for drop coring

---

**SUMMARY OF EVENTS**


---

10:50 1st core 19m from location approx 0.6m long Sand and shells  
 11:30 2nd core 15m from location approx. 06 m long  
 Pack up drop core equip.  
 11:55 Deploy SSS fish  
 12:00 DGPS signals stopped. Problem at Base with GPS Rx.  
 12:30 Recover SSS fish and prepare acoustic Xponders for deployment  
 13:52 Xp 112 dropped  
 14:13 Xp 313 dropped  
 14:15 Corrections restored from base station  
 14:32 Xp 109 dropped  
 14:53 Xp 410 dropped  
 15:10 At anchor at location waiting for next GPS session.  
 Measurement of baselines for relative calibration  
 16:15 Velocity dip 1499.4 m/sec.  
 19:00 Weigh anchor, deploy fish and wait for good GPS.  
 19:39 SOL K41  
 19:56 EOL K41  
 20:07 SOL K40  
 20:19 EOL K40  
 20:50 SOL K39  
 21:07 EOL K39  
 21:18 SOL K38  
 21:26 EOL K38 End line early, 1st 1200 m ok.  
 21:30 Base station ceased sending corrections.  
 21:35 Recover SSS fish  
 21:50 Vessel at anchor at location  
 23:59 Standing by.

	PRODUCTION	TRAVEL	WEATHER	DOWNTIME	EXTERNAL
14:58	NIL	NIL	01:02	NIL	

King #1

Lines surveyed = 22,19,16,13,8A,10A,7A,41,40,39,38

Sub Total = 11

Total = 38

---

**SUMMARY OF EVENTS**

---

*17 JUNE 1992*

00:00 At anchor at King #1.  
03:15 Deploy E/S transducer and SSS fish.  
Running into first line  
03:30 SOL K37  
03:48 EOL F37  
04:00 SOL K36  
04:17 EOL K36  
04:28 SOL K35  
04:45 EOL K35  
04:55 SOL K34  
05:11 EOL K34  
05:23 SOL K33  
05:39 EOL K33  
05:50 SOL K32  
06:06 EOL K32  
06:22 SOL K38A  
06:40 EOL K38A  
06:52 SOL K40A  
07:10 EOL K40A  
07:20 SOL K42  
07:37 EOL K42  
07:47 SOL K43  
08:04 EOL K43  
08:13 SOL K44  
08:30 EOL K44  
08:15 Retrieved equip.  
09:15 Recover E/S Xducer and attach acoustic Xducer.  
Redeploy  
09:38 Commence Box In of acoustic transponders  
11:45 Complete box ins of three xponders.  
12:10 Vessel at anchor in centre of array whilst calibration data is calculated.  
13:20 Recover E/S transducer and redeploy acoustic transducer at 15m.  
14:20 Velocity dip

---

**SUMMARY OF EVENTS**


---

16:00 Complete calibration calculations  
 Waiting for good GPS for comparison of systems

18:00 Commence comparison of DGPS and Acoustic positioning systems.  
 Agreement to  $\pm 5$ m. Calibration accepted as OK.

18:20 Recover xducer  
 Heave anchor

18:35 Vessel underway to Wild Dog #1 location

23:59 Underway to Wild Dog #1 location.

PRODUCTION	TRAVEL	WEATHER	DOWNTIME	EXTERNAL
13:20	NIL	NIL	NIL	NIL

King #1

Lines surveyed = 37,36,35,34,33,32,38A,40A,42,43,44

Sub Total = 11

Total = 49

*18 JUNE 1992*

00:00 Underway to Wild Dog #1 location

01:00 Enter Shell Permit VIC P/28

01:45 DGPS working OK

03:15 Arrive Wild Dog #1 location.

03:25 Deploy E/S transducer

03:40 Velocity profile dip = 1498.07 m/s

04:00 Bar check on Echo Sounder. Draft = 2.99m

04:15 Deploy SSS fish  
 Running into first line  
 Aborted due to DGPS poor update rate.  
 Standing by for better signals

04:39 SOL WD1

04:42 EOL WD1 - Aborted poor corrections

04:59 SOL WD1A

05:11 EOL WD1A

05:20 SOL WD4

05:32 EOL WD4

---

**SUMMARY OF EVENTS**

---

05:42 SOL WD7  
05:43 EOL WD7 - Aborted poor corrections  
Standing by for decent update rate from DGPS  
07:21 SOL WD7A  
07:33 EOL WD7A  
07:43 SOL WD10  
07:56 EOL WD10  
08:07 SOL WD13  
08:19 EOL WD13  
08:30 SOL WD16  
08:42 EOL WD16  
08:52 SOL WD19  
09:05 EOL WD19  
09:20 SOL WD21  
09:32 EOL WD21  
09:43 SOL WD18  
09:57 EOL WD18  
10:06 SOL WD15  
10:17 EOL WD15 - re run first 600m  
10:27 SOL WD11  
10:40 EOL WD11  
11:04 SOL WD8  
11:15 EOL WD8 - re run if possible  
11:25 SOL WD5  
11:38 EOL WD5  
11:45 SOL WD2  
11:58 EOL WD2  
12:09 SOL WD3  
12:20 EOL WD3 - re run if possible  
12:35 SOL WD6  
12:47 EOL WD6  
12:56 SOL WD9  
13:10 EOL WD9  
13:19 SOL WD12  
13:31 EOL WD12 - to be re run

---

SUMMARY OF EVENTS

---

14:02 SOL WD14  
14:15 EOL WD14  
14:26 SOL WD17  
14:38 EOL WD17  
14:45 Retrieved SSS fish.  
15:10 Preparing current meter  
15:20 At anchor at Wild Dog #1  
15:45 Taking current readings  
18:20 Taking current readings  
20:30 Taking current readings  
21:30 Complete current meter readings.  
23:59 Standing by at Wild Dog #1 location.

PRODUCTION	TRAVEL	WEATHER	DOWNTIME	EXTERNAL
16:37	NIL	NIL	01:38	NIL

## Wild Dog #1 location

Lines surveyed = 1A,4,7A,10,13,16,19,21,18,  
15,11,8,5,2,3,6,9,12,14,17

Re runs to be done = 12,8?,3?,15 -500m

Sub Total = 20

Total = 20

*19 JUNE 1992*

00:00 Standing by at location  
05:45 Heave anchor  
DGPS signals not received  
System unusable  
Standing by for better signals  
07:30 DGPS signal useable  
07:30 Deploy SSS fish  
07:47 SOL WD20 - No heave on analogue trace. Manual fixing as  
fix input faulty.  
08:00 EOL WD20  
08:19 SOL WD12A - Heave compensator not working

---

**SUMMARY OF EVENTS**

---

Digitised depths not logged.  
Line to be processed by hand digitising

08:31 EOL WD12A  
Working on Deso 20 during line change

09:03 SOL WD3A - Fixing and digitised depths Ok.

09:17 EOL WD3A

09:36 SOL WD23

09:48 EOL WD23

10:00 SOL WD26

10:15 EOL WD26

10:26 SOL WD29

10:37 EOL WD29

10:50 SOL WD32

11:05 EOL WD32

11:16 SOL WD35

11:28 EOL WD35

11:43 SOL WD38

11:49 EOL WD38 - line aborted  
Problems with GPS receiver. Spare installed.

12:55 SOL WD39

13:07 EOL WD39 - re run if possible

13:15 GPS very poor. Operations stopped until evening session.

13:20 Recover SSS fish.

13:40 At anchor. Maintenance on echo sounder.

17:45 Raise anchor and deploy SSS fish.

18:01 SOL WD42

18:13 EOL WD42

19:09 SOL WD41

19:17 EOL WD41  
Operations ceased due to poor update rate for GPS  
corrections from Base Station.

19:20 Tried alternate frequency for corrections - no good.

20:15 Retrieved equip.  
At anchor at Wild Dog #1.

23:59 Standing by at Wild Dog #1 location.

## SUMMARY OF EVENTS

PRODUCTION	TRAVEL	WEATHER	DOWNTIME	EXTERNAL
07:30	NIL	NIL	07:15	NIL

Wild Dog #1 location

Lines surveyed = 20,12A,3A,23,26,29,32,35,38,39,42,41

Re runs to be done = 38 and possibly 39

Sub Total = 12

Total = 32

20 JUNE 1992

00:00 Standing by at location

06:45 Heave anchor  
DGPS signals not received fast enough for production to commence. System unusable.

07:15 Deploy SSS fish  
Standing by for better signals

07:30 DGPS signal useable

07:55 SOL WD40

08:08 EOL WD40

08:19 SOL WD37

08:33 EOL WD37

08:41 SOL WD34

08:54 EOL WD34

09:03 SOL WD31

09:17 EOL WD31

09:26 SOL WD28

09:39 EOL WD28

09:54 SOL WD27

10:17 EOL WD27

10:24 SOL WD30

10:38 EOL WD30

10:47 SOL WD33

11:00 EOL WD33

11:10 SOL WD36

## SUMMARY OF EVENTS

11:24 EOL WD36  
 11:33 SOL WD41A  
 11:46 EOL WD41A  
 11:55 SOL WD38A  
 12:09 EOL WD38A  
 12:18 SOL WD42A  
 12:25 EOL WD42A  
 12:39 SOL WD15A  
 12:47 EOL WD15A  
 13:04 SOL WD24  
 13:18 EOL WD24  
 13:28 SOL WD25  
 13:39 EOL WD25  
 13:48 SOL WD22  
 14:03 EOL WD22  
 14:15 SOL WD24A  
 14:21 EOL WD24A  
 14:30 Retrieved underwater equip.  
 Set up for drop coring.  
 15:06 Core WD5  
 15:31 Core WD2  
 16:29 Core WD9  
 16:49 Core at location  
 18:00 Core WD8  
 18:55 Core WD4  
 GPS update rate poor.  
 19:15 Vessel at anchor at Wild Dog #1 location.  
 23:59 Standing by at Wild Dog #1 location.

PRODUCTION	TRAVEL	WEATHER	DOWNTIME	EXTERNAL
11:25	NIL	NIL	01:38	NIL

Wild Dog #1 location

Lines surveyed = 40,37,34,31,28,27,30,33,36,  
 41A,38A,42A,15A,24,25,22,24A

---

**SUMMARY OF EVENTS**

---

Re runs to be done =  
Sub Total = 17  
Total = 49

*21 JUNE 1992*

00:00 Standing by at location  
06:50 Heave anchor  
07:15 Prepare drop corer  
07:32 Core WD3  
08:03 Core WD7  
08:05 GPS system not useable due to USDOD altering system  
Vessel to anchor  
ASI packing equipment  
Bar check on E/S  
Demob E/S transducer  
10:05 GPS back on line  
Because there is no free fall winch, wire is getting tangled.  
Trying different release methods.  
10:43 Core WD14  
11:22 Core WD16 - no recovery  
Great angle with wire rope  
11:52 Tangle undone  
12:29 Core WD10  
12:45 Core WD12  
13:00 Core WD15  
13:18 Core WD17  
13:38 Core WD11  
14:00 Core WD13  
14:19 Core WD6  
14:46 Core WD16A  
15:22 Core WD18  
Retrieved and secured coring equip.  
14:40 Departed Wild Dog #1 site.  
Underway to Port Melbourne.  
ASI demobbing survey equipment.

---

**SUMMARY OF EVENTS**

---

19:45 At anchor of Pt. Lonsdale  
23:59 Standing by outside entrance to Port Phillip Bay.

PRODUCTION	TRAVEL	WEATHER	DOWNTIME	EXTERNAL
05:55	NIL	NIL	00:30	02:00

**22 JUNE 1992**

00:00 At anchor outside entrance to Port Phillip Bay  
00:30 Pilot boards vessel for trip to Victoria Dock.  
05:00 Alongside at Victoria Dock.  
10:45 DNV representative arrives for Off Hire survey  
12:00 DNV representative departs after completion of Off Hire survey.  
ASI demobbing equipment.  
12:00 J Rutherford departs vessel.

**CLIENT:** SAGASCO RESOURCES LIMITED AND SHELL  
DEVELOPMENT (AUSTRALIA) PTY LTD

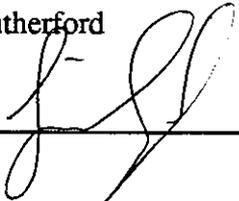
**TITLE:** SITE SURVEYS IN THE BASS STRAIT JUNE  
1992 KING #1 FLINDERS #1 WILD DOG #1

**REPORT NO:** LTD 098

**COPIES:** 4

**ISSUE DATE:** 3 July 1992

**PREPARED BY:** John Rutherford

  
\_\_\_\_\_

Date

31/7/92

**APPROVED BY:** B E Milliken

  
\_\_\_\_\_

Date

7/7/92

**APPENDIX A**

---

A Preliminary Report for Wild Dog #1

WILD DOG - 1  
(PERMIT VIC - P/25)  
BATHYMETRIC AND GEOHAZARD SITE SURVEY  
PRELIMINARY REPORT  
22ND JUNE, 1992

Prepared for: SHELL DEVELOPMENT (AUSTRALIA) PTY LTD  
1 SPRING STREET  
MELBOURNE. VICTORIA.

Prepared by: ASSOCIATED SURVEYS INTERNATIONAL PTY LTD  
18 PROWSE STREET  
WEST PERTH WA 6005

Between 19th and 21st June, 1992, Associated Surveys International conducted an echo sounder and side scan sonar survey over a 2km by 2km site centred on the proposed Wild Dog - 1 location with given co-ordinates of:

Latitude 38 deg 47 min 17.2 sec South  
Longitude 144 deg 07 min 33.3 sec East

250363.9m Eastings, 5702797.5m Northings.

100m spaced primary lines were surveyed on a bearing of 005/185 deg, and cross lines were also surveyed at 100 m spacing.

Preliminary results of echo sounding, without tidal reductions, show the seabed across the site to be almost flat with a slight slope from slightly less than 78m in the south to almost 79m in the northwest.

At location an unreduced depth of 78.4 is recorded and the seabed is smooth and almost flat.

Preliminary side scan sonar interpretations show no protuberances or debris on the seabed over the site and no evidence of gas seepage is noted, although more detailed study of the data is required.

The side scan sonar records show the seabed to have low to moderate reflectivity, with textured features across the entire site. This is interpreted as indicating uniform mostly fine grained sediments with very shallow current scoured irregularities and depressions, up to 2m across and as dense as 50 to 100 per hectare across the site.

There are large patches particularly in the west and southwest portions of the site, with striated features trending southwest to northeast which on brief analysis are interpreted as flat lying outcrops of denser cohesive or cemented sediment with very thin loose sediment cover.

Drop coring near the location and at anchor locations 600m from the location indicates that the seabed sediments typically comprise uncohesive uniform fine sands occasionally with minor fine shell gravel. These sediments according to estimated drop corer penetration are approximately 1.5m thick at every sample position, possibly overlying denser clayey sediments.

More accurate post plotting of side scan sonar features and core positions will be required to determine whether the possible outcrops of denser material to the west have been tested by coring.

The survey results indicate no hazards to the placement of a rig at this location, and the sediments as sampled near the location should have adequate anchor holding capacity if they are continuous over the rest of the surveyed site.

However in the absence of any other information from the sub-bottom, there is no way of determining the presence or absence of possible sub-bottom drilling hazards such as gas pockets.

**APPENDIX B**

---

**B**      On-hire survey of Derwent  
Enterprise

263046



**DNV**

**MELBOURNE OFFICE**  
Suite 21, Guild Court  
96 Camberwell Road  
EAST HAWTHORN VIC 3123  
AUSTRALIA.  
Tel. 03) 8132033  
Fax. 03) 8821850

DATE : 1992.06.04	COPY :
OUR REF.: 503-JRM	ATTN :
TO : SEGASCO.	
ATTN : MR. MIKE RENISON	
FAX NO : 08. 223.1851	
FROM : JOE MILLER DET NORSKE VERITAS, MELBOURNE	
TOTAL NO OF PAGES TRANSMITTED FIVE (INCLUDING THIS PAGE)	

RE. DERWENT ENTERPRISE (rx LADY VERA)

Following is report of on/off hire of the above vessel, carried out on 1992.06.03. The original will be forwarded by mail.

Best regards,

J.R. MILLER.  
Manager - Melbourne.

DRILLING DEPARTMENT		
DISTRIBUTION	DATE	INT.
TTE		
PMD		
JXI.		
MJR	4/6	4/6.
EMF		
SHELL		
FILE No:		







263050

82-MEL-047



# DET NORSKE VERITAS

PLACE: MELBOURNE, VIC.

DATE: 1992 JUNE 03

J.R. MILLER.  
Manager - Victoria & Tasmania.

It is agreed that any or several below Det Norske Veritas, its subsidiaries, bodies, officers, directors, employees and agents shall have no liability for any loss, damage or expenses allegedly caused directly or indirectly by their activities or negligence, breach of contract, or any other such negligence or error by them, including those negligence or error committed by any third party with the exception of gross negligence or willful misconduct by the governing bodies of their respective subsidiaries of Det Norske Veritas. This limited responsibility of liability shall also, however, be assumed by any third party who has acted or acted in reliance on the professional advice or information given by or on behalf of Det Norske Veritas. However, if any person uses the services of Det Norske Veritas or its subsidiaries or relies on any data also made or information given by or on behalf of them and to some extent suffers a loss, damage or expense proved to be due to their negligence, omission or default, then Det Norske Veritas will not be liable for any or several of such loss, damage or expense by reason of its negligence, omission or default. In the event Det Norske Veritas or its subsidiaries may be held liable in respect of such loss, damage or expense, the amount of compensation shall cover no more than the amount of the fee, if any, charged for that particular service, together with the amount of any reasonable and substantiated expenses that the claimant or claimants who have personally incurred the loss, damage or expense in such case. It is the intent that any provision in this section shall be void insofar as it purports to limit the liability of the claimant or claimants who have personally incurred the loss, damage or expense in such case.

The Vessel is the ex-"Lady Vera", renamed "Derwent Enterprise" under Australian flag. She has been modified into a sterntrawler, but that is as far as she went. The advantage is that she gained a tween deck, which can be used for workshop, additional accommodation, labs or offices.

We have been using the vessel for coring in the Bass Strait with great success.

The following are the details of the Vessel

**Dimensions:** Length o.s. : 57.9 mtr.  
Beam, mided : 13.2 mtr  
Depth mided : 4.9 mtr.  
Loaded Draft: 4.4 mtr.  
GRT : 987

**Machinery:**

Main Engines 4 x 1100 BHP Daihatsu PSH TCM - 26D diesel engines, total  
4400 BHP, 2 x Mikado propellers in fixed nozzles.  
Bowthruster: Kamewa 300 HP CP propeller, rated at 3.6 tonnes thrust  
El. Generators: 2 x 250 KW 415V 50Hz, 1 x 100 KW standby set.

**Capacities**

Deck Cargo Max 530 tonnes.  
Clear Deck Space 30.5 x 10.3 mtr.  
Deck Loading 5 tonnes/m<sup>2</sup>  
Total DWT 1000 tonnes  
Fuel 354 tonnes  
Fresh water 200 tonnes  
Ballast water 150 tonnes  
Refr. storage Approx: 15 m<sup>3</sup> cooler and 15 m<sup>3</sup> freezer.  
Tween deck space Approx. 30. x 10 x 2.7 mtr. high.

**Anchor & Mooring:**

Anchor 2 x 1270 kg anchors  
Cables 2 x 350 mtr. stud link chain  
Stern Mooring 2 x 37 ton hydr. winches with each 1000 mtr. 1.25 inch wire  
for each 2 (or more) ton anchors.

**Accommodation:**

Crew 9 x 1 berth  
Charterer 1 x 1 berth  
Passengers 1 x 5 berth, 1 x 7 berth

**Electronics:**

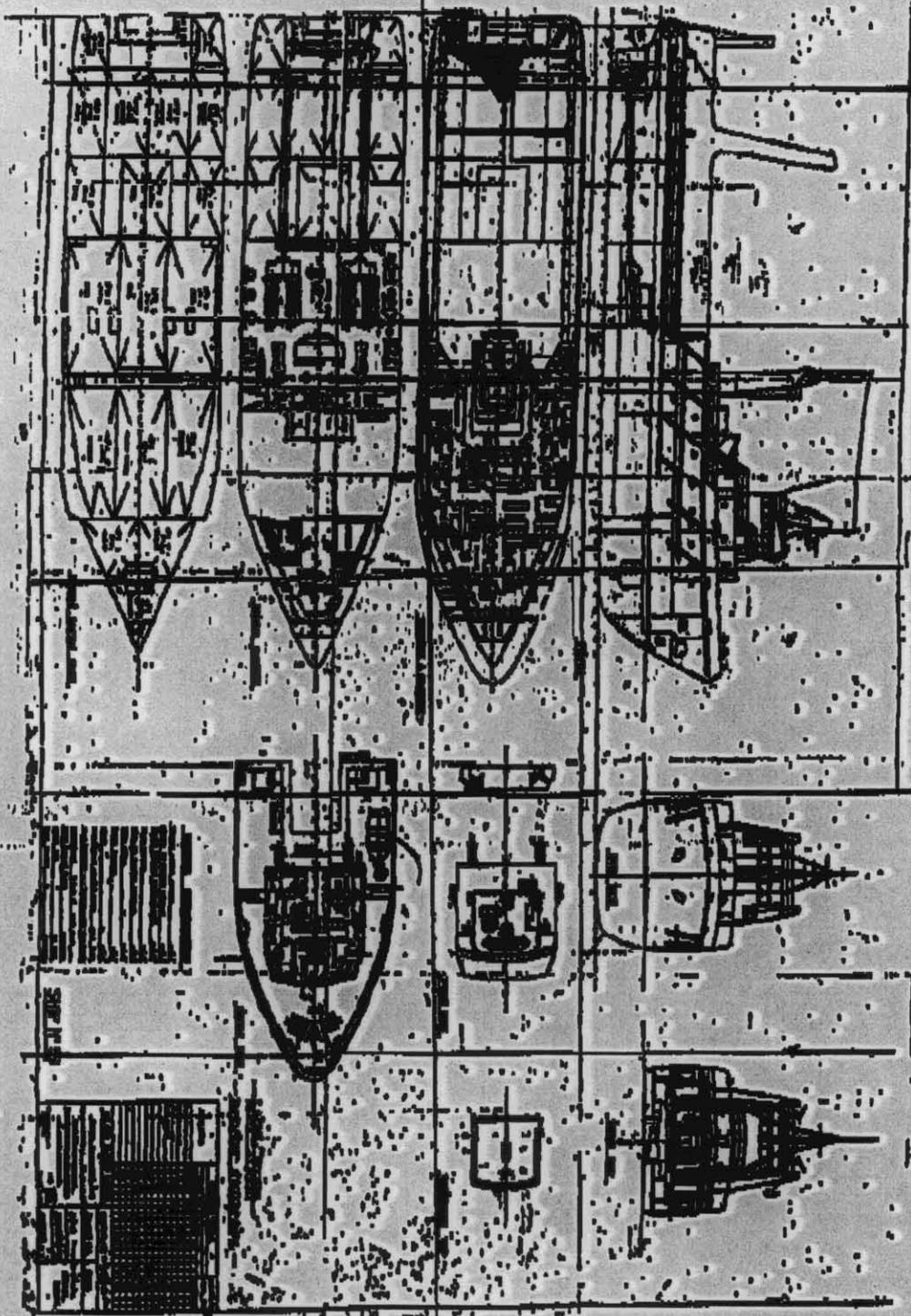
Setnav Fitted  
Radar Furuno ER711  
Echo Sounder Simrad EP2BN  
Auto Pilot Decca 42E14/350  
Gyro Compass Platt Navigator II  
Radio Sailor T124/R110, Sailor R501  
VHF Sailor RT14C

(Attached some schematics of the Vessel).

263052

MAY-28-'92 WED 16:42 ID:KOREVAAR MARINE GRP TEL NO:03 397 7532

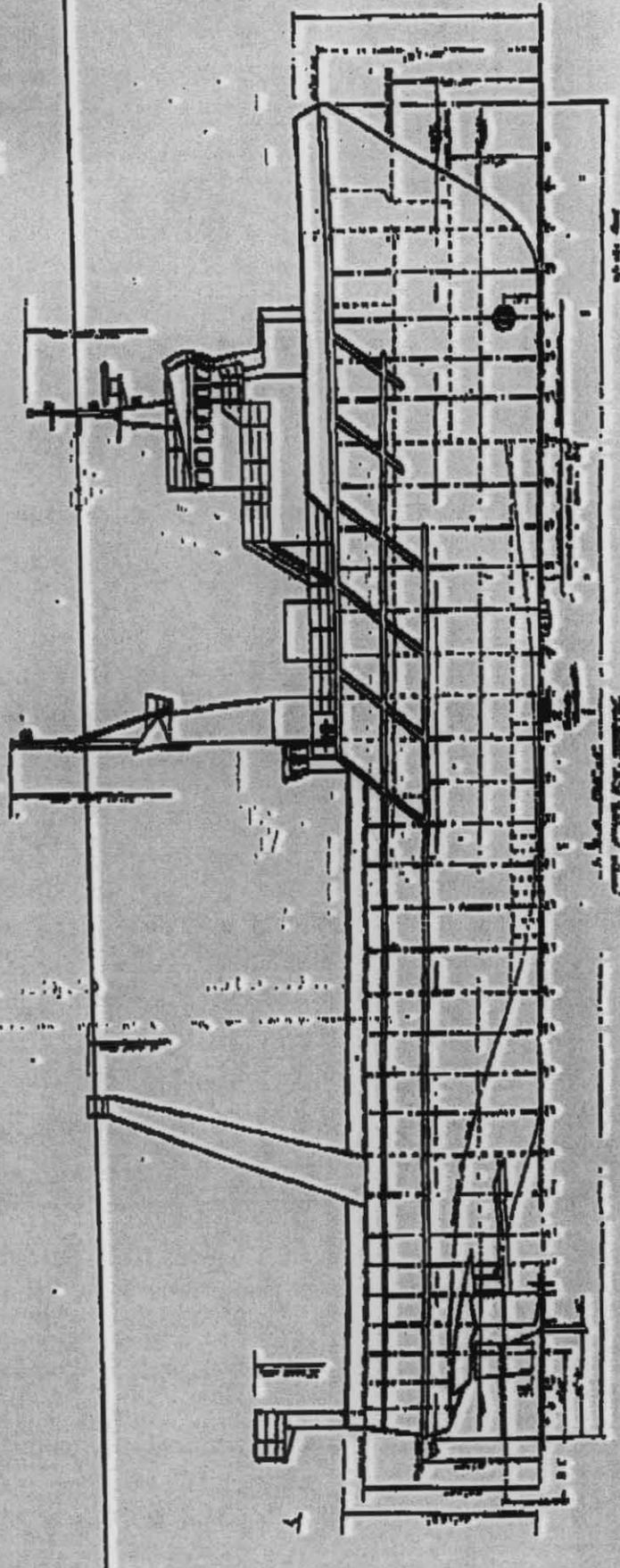
H661 P03



MAY-20-'92 WED 16:44 ID:KOREVAAR MARINE GRP TEL NO:03 397 7532

#661 P04

263053



**APPENDIX C**

---

C Associated Survey International  
Log Sheets

**CONTRACTOR** ASSOCIATED SURVEYS INTERNATIONAL

**DAILY OPERATIONS REPORT (HYDRO)**

CLIENT	SAGASCO	JOB NO.	8978	DATE	2/6/92
LOCATION	MELBOURNE	VESSEL	DERWENT ENTERPRISE		

FROM	TO (E.S.T)	SUMMARY OF OPERATIONS
(W.A.T) 0700	1230	P. Caswell / N. Smith / A. Terrill travel Perth → Melbourne
PM		Onboard vessel Derwent Enterprise at 14 Victoria Dock. Locate equipment and commence mobilisation.
		H. Campigli mobilise base station for Diff. GPS at Blackwarry, Victoria
		Overnight Riverside Apartments Melbourne

EQUIPMENT	NUMBER	EQUIPMENT	NUMBER	PERSONNEL	TITLE
GPS WINDOWS PC	1	PAN SPARES	1	P. CASWELL	SURVEYOR
PCNAV PC	2 (1SP)	COMPATT	4	A TERRILL	GEOPHYSICIST
MONITOR	3	DUNKING TRANS.	2	N. SMITH	ENGINEER
CODAN RADIO/ANT.	1	SIDE SCAN 260	1	H. CAMPIGLI	GPS BASE OP.
FURON0 RADIO/ANT.	1	PRINTER	2 (1SP)		
PAKRATT MODEM	2 (1SP)	TSS 320	1	BASE STATION	
ASHTEC GPS	2 (1SP)	SVP 16	1	CODAN RADIO	2 (1SP)
DESO 20	1	SIDE SCAN WINCH	1	PAKRATT	2 (1SP)
PAN	1	DROP CORER	2 (1SP)	80' ANTENNA	1
CONSUMABLES				GPS WINDOWS PC	2 (1SP)
VEHICLE		BUDGET STATION WAGON		(NOT INSTALLED)	
ACCOMMODATION		3 X RIVERSIDE APPTS			

AUTHORISED CONTRACT CHANGES/COMMENTS

PARTY CHIEF'S SIGNATURE	CLIENT REPRESENTATIVES SIGNATURE	DOR
<i>PA Caswell</i>	<i>[Signature]</i>	2901
		Document No. AS-HY-001(1)

CONTRACTOR

ASSOCIATED SURVEYS INTERNATIONAL

DAILY OPERATIONS REPORT (HYDRO)

CLIENT SAGASCO JOB NO. 8978 DATE 3/6/92

LOCATION MELBOURNE VESSEL DERWENT ENTERPRISE

FROM	TO	SUMMARY OF OPERATIONS
AM		Personnel conference with mobilisation of vessel. Install survey equipment on bridge and test all computer equipment. Install radios and GPS on bridge roof/main mast - test interfacing to computers/modem fabrication of echosounder bracket commences. Install cables for sidescan winch and connect to hydraulics.
	PM	No meals / accommodation onboard.

EQUIPMENT	NUMBER	EQUIPMENT	NUMBER	PERSONNEL	TITLE
[AS DOR 2902]				P. CASWELL	SURVEYOR
				A TERRILL	GEO PHYSICIST
				N. SMITH	ENGINEER
				M. CAMPIGLI	GPS BASE OP.
CONSUMABLES					
VEHICLE BUDGET STATION WAGON					
ACCOMMODATION 3x RIVERSIDE APPTS					

AUTHORISED CONTRACT CHANGES/COMMENTS

PARTY CHIEF'S SIGNATURE <i>PACowell</i>	CLIENT REPRESENTATIVES SIGNATURE <i>[Signature]</i>	DOR 2902
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CONTRACTOR

ASSOCIATED SURVEYS INTERNATIONAL

## DAILY OPERATIONS REPORT (HYDRO)

CLIENT	SAGASCO	JOB NO.	HY 8978	DATE	4/6/92
LOCATION	MELBOURNE	VESSEL	DERWENT ENTERPRISE		

FROM	TO	SUMMARY OF OPERATIONS
AM		Complete modifications to Deso 20 and test with TSS 320 Compensator. Interface TSS 320 to PCNav computer.
		Pour concrete for 29x weights alongside dock.
		Complete interfacing of fix box and test.
		HF radius tested and loaded with DGPS operating frequencies
		H. Campigli to vessel to collect computers for base station.
		Run sidescan cable through block and run cable to bridge for counter. Self test on 260 recorder passed OK.
	PM	No meals/accommodation onboard vessel

EQUIPMENT	NUMBER	EQUIPMENT	NUMBER	PERSONNEL	TITLE
[AS DOR 2901]				P. CASWELL	SURVEYOR
				A. TERRILL	GEOPHYSICIST
				N. SMITH	ENGINEER
				H. CAMPIGLI	GPS BASE OP.
CONSUMABLES					
VEHICLE		BUDGET STATION WAGON			
ACCOMMODATION		3x RIVERSIDE APARTMENTS			

AUTHORISED CONTRACT CHANGES/COMMENTS

ADVISED BY ASI THAT DELAY TO ARRIVAL OF SSS FISH. VESSEL CANNOT SAIL UNTIL FRIDAY PM / SATURDAY

PARTY CHIEF'S SIGNATURE

P.A. Caswell

CLIENT REPRESENTATIVES SIGNATURE



DOR

2903

DAILY OPERATIONS REPORT (HYDRO)

CLIENT SAGASCO	JOB NO. HY B97B	DATE 5/6/92
LOCATION MELBOURNE	VESSEL DERWENT ENTERPRISE	

FROM	TO	SUMMARY OF OPERATIONS
AM		Personnel check out of hotel* and continue with mobilisation of vessel.
		Assemble drop cover and check components
		Test download and data collection of SVP
		Connect straps to Compatt releases and install in float collars.
		Assemble Echosounder transducers to bracket and test
		Modify drop coring winch to increase diameter
1500		Safety meeting.
		Concrete blocks and spare sounder loaded onboard
		Obtain channel beacon coords from MPA.
		Commence securing of mobilised equipment on bridge and transit cases in hold.
		Personnel (x 3) accommodated onboard. Lunch only taken.

EQUIPMENT	NUMBER	EQUIPMENT	NUMBER	PERSONNEL	TITLE
AS DOR 290	WITH	ADDITION		P. CASWELL	SURVEYOR
of :-				A. TERRILL	GEOPHYSICIST
DESD 10	1 (SP)			N. SMITH	ENGINEER
COMPATT WEIGHTS	29 ]			H. CAMPIGLI	GPS BASE OP

CONSUMABLES					
VEHICLE	BUDGET STATION WAGON				
ACCOMMODATION	(ONBOARD VESSEL)			* HOTEL BILL PAID NIGEL SMITH ASI DINERS CARD.	

AUTHORISED CONTRACT CHANGES/COMMENTS LOAD 60 TONS FUEL TO DERWENT ENTERPRISE

PARTY CHIEF'S SIGNATURE

PA Caswell

CLIENT REPRESENTATIVES SIGNATURE



DOR

2904

263059

CONTRACTOR ASSOCIATED SURVEYS INTERNATIONAL

## DAILY OPERATIONS REPORT (HYDRO)

CLIENT	SAGASCO	JOB NO.	HY 8978	DATE	6/6/92
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LOCATION	MELBOURNE	VESSEL	DERWENT ENTERPRISE
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FROM	TO	SUMMARY OF OPERATIONS
AM		Wind drop core wire and rope for SV16 onto respective winches.
		Complete extension of E/S cables and secure all equipment for passage. Wet test E/S transducers
		Complete testing of side scan winch hand controls
		Measure offsets and enter survey parameters to PCNav
1230	1340	Collect side scan fish/current meter from airport and return to vessel - test side scan fish on deck and in water.
1600		DGPS corrections received initial power supply problems at base.
1800		Pilot onboard, depart Melbourne for long 1 location
		Gross error checks on DGPS along navigation channel
	→ 2359	Continue passage to site

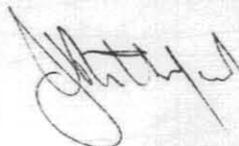
EQUIPMENT	NUMBER	EQUIPMENT	NUMBER	PERSONNEL	TITLE
AS DOR 2904	WTH	ADDITION OF :-		P. CASWELL	SURVEYOR
				A. TERRILL	GEOPHYSICIST
272 Tow FISH	2 (ISP)			N. SMITH	ENGINEER
CURRENT METER	1			H. CAMPIGLI	GPS BASE OP.
				D. LOVERING	SURVEYOR
				(ON BOARD 1100 HRS)	
CONSUMABLES					
VEHICLE BUDGET STATION WAGON RETURNED 1650 HRS					
ACCOMMODATION 4x ONBOARD VESSEL RENTAL # 255392					

AUTHORISED CONTRACT CHANGES/COMMENTS  
 1600 HRS D.P FUEL TANKS 7C 850mm 7S MT  
 7P 790mm DAILY SERVICE 2700 Gallons

PARTY CHIEF'S SIGNATURE

PA Caswell

CLIENT REPRESENTATIVES SIGNATURE



DOR

2905

## CONTRACTOR

## DAILY OPERATIONS REPORT (HYDRO)

CLIENT	SAGASCO	JOB NO.	HY 8978	DATE	7/6/92
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LOCATION	KING 1 - BASS STRAIT	VESSEL	DERWENT ENTERPRISE
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FROM	TO	SUMMARY OF OPERATIONS
0000	→	Passage to King 1 location
0530		Vessel cross into sagasco Block T/18P - mobilisation officially completed.
0730	0820	Stream side scan cable and mark up intervals
0800	1015	GPS unusable in either differential or stand alone mode - attributed to US operators
1100		DGPS good, on location for SV16 dip
1130	1230	Deploy and secure E/S Transducer bracket stbd side
1255		Bar check. Draft 2.97m Mean velocity 1502.76 m/s
1315		Deploy side scan fish
1330		Adjust GPS antenna and run into first line
1400	1530	Survey equipment operational, running practise lines for track control
1625	2359	Vessel at Anchor for night

EQUIPMENT	NUMBER	EQUIPMENT	NUMBER	PERSONNEL	TITLE
[AS DOR 2905]			O/B VESSEL	P. CASWELL	SURVEYOR
				D. LOVERING	- " -
				A. TERRILL	GEOPHYSICIST
				N. SMITH	ENGINEER
				H. CAMPIGLI	GPS BASE OP
CONSUMABLES					
VEHICLE					
ACCOMMODATION					

## AUTHORISED CONTRACT CHANGES/COMMENTS

07:30 ARRIVE KING #1 LOCATION

PARTY CHIEF'S SIGNATURE

PA Caswell

CLIENT REPRESENTATIVES SIGNATURE



DOR

2906

**CONTRACTOR** ASSOCIATED SURVEYS INTERNATIONAL

**DAILY OPERATIONS REPORT (HYDRO)**

CLIENT	SAGASCO	JOB NO.	HY 8978	DATE	8/6/92
LOCATION	KING 1 - BASS STRAIT		VESSEL	DERWENT ENTERPRISE	

FROM	TO	SUMMARY OF OPERATIONS
0000	0100	AT Anchor
0100		Heave up anchor and run up positioning system
	0240	- check with base station. Proceed towards location
0250		Deploy fish and wait on good satellite positioning
0330		Running primary survey lines 160°/340° with
	1430	Echosounder and side scan to end of GPS window
1435		Remark side scan cable and recover fish -
	1545	make adjustments to pulley block
1510		Drop anchor approx 7km @ 345° to King 1
1510	1540	Back up survey data to disc

EQUIPMENT	NUMBER	EQUIPMENT	NUMBER	PERSONNEL	TITLE
[AS DOR 2905]				P. CASWELL	SURVEYOR
			O/B	D. LOVERING	- " -
			VESSEL	A. TERRILL	GEOPHYSICIST
				N. SMITH	ENGINEER
				H. CAMPOLI	GPS BASE OP.
CONSUMABLES					
VEHICLE					
ACCOMMODATION					

AUTHORISED CONTRACT CHANGES/COMMENTS

PARTY CHIEF'S SIGNATURE

*P. Caswell*

CLIENT REPRESENTATIVES SIGNATURE

*[Signature]*

DOR

2907

CONTRACTOR

ASSOCIATED SURVEYS INTERNATIONAL

263062

DAILY OPERATIONS REPORT (HYDRO)

CLIENT SAGASCO JOB NO. MY 8978 DATE 9/6/92

LOCATION KING 1 - BASS STRAIT VESSEL DERWENT ENTERPRISE

Table with columns: FROM, TO, SUMMARY OF OPERATIONS. Includes notes on wind conditions (WIND NW 15-20 KTS INCREASING 25-30 KTS) and various survey activities like 'At Anchor', 'Heave up anchor', 'Deploy side scan fish', 'Running survey lines with Echo sounder and side scan on bearing 160/340°', 'Break in survey due to lost corrections from base', 'Decision to stop lines due to deterioration in weather', 'Recover fish and Echo sounder bracket', 'Back up survey data to disc and routine preparation'.

Table with columns: EQUIPMENT, NUMBER, EQUIPMENT, NUMBER, PERSONNEL, TITLE. Includes personnel: P. CASWELL (SURVEYOR), D. LOVERING, A. TERRILL (GEOPHYSICIST), N. SMITH (ENGINEER), H. CAMPIGLI (GPS BASE OP).

CONSUMABLES
VEHICLE
ACCOMMODATION

AUTHORISED CONTRACT CHANGES/COMMENTS
FIRST LINE FOR DAY COMMENCED 04:49

PARTY CHIEF'S SIGNATURE

PA Caswell

CLIENT REPRESENTATIVES SIGNATURE

[Handwritten signature]

DOR

2908





CONTRACTOR ASSOCIATED SURVEYS INTERNATIONAL

## DAILY OPERATIONS REPORT (HYDRO)

CLIENT	SAGASCO	JOB NO.	HY 8978	DATE	12/6/92
LOCATION	BASS STRAIT	VESSEL	DERWENT ENTERPRISE		
FROM	TO	SUMMARY OF OPERATIONS			
0000	0130	Vessel passage to Finders 1 site			
0130		Arrive on location, running cross lines in direction 070°/250° to assess sea conditions for running lines.			
	0345	Vessel underway to shelter, conditions remain unfavourable for <del>safe</del> safe deployment of survey equipment and collection of satisfactory data			
0345		At Anchor off Stanley.			
		General maintenance and administration			
		Dumny was with drop cover device, assemble weights and secure.			
	2359				

EQUIPMENT	NUMBER	EQUIPMENT	NUMBER	PERSONNEL	TITLE
[AS DOR 2905]				P. CASWELL	SURVEYOR
			O/B	D. LOVERING	- " -
			VESSEL	A. TERRILL	GEOPHYSICIST
				N. SMITH	ENGINEER
				H. CAMPICLI	GPS BASE OP.
CONSUMABLES	PURCHASED 150M x 10MM WIRE FOR DROP COVER				
VEHICLE					
ACCOMMODATION					

AUTHORISED CONTRACT CHANGES/COMMENTS

PARTY CHIEF'S SIGNATURE

PA Caswell

CLIENT REPRESENTATIVES SIGNATURE



DOR

2911

**CONTRACTOR**

ASSOCIATED SURVEY INTERNATIONAL

**DAILY OPERATIONS REPORT (HYDRO)**

CLIENT	SAGASCO	JOB NO.	HY 8978	DATE	13/6/92
LOCATION	FLINDERS 1 - BASS STRAIT	VESSEL	DERWENT ENTERPRISE		

FROM	TO	SUMMARY OF OPERATIONS
0800		Heave up on Anchor and u/way to Flinders
0230		Survey system operational 11 km from location
0320	0350	Arrive on location rig up and deploy transducer
0400		SVP16 velocity dip. Mean water column velocity 150155 M/s. Transducer draft 297m - too rough for bar check.
0430	0445	Deploy fish and run in to line about due to noise interference on DGPS corrections
0535		Corrections improved commence run in to cross line F44
0554	1415	Running Echo sounder + side scan survey lines
1420	1435	GPS window ended Recover fish and anchor on location
1430	1700	Reposition radio equipment to try and reduce interference from Desso 20. Spool new wire to drop core wrench + mark
1805	1920	Weigh anchor deploy fish and wait for good GPS.
1932	2130	Running survey lines until end of GPS window

EQUIPMENT	NUMBER	EQUIPMENT	NUMBER	PERSONNEL	TITLE
2200	2359	Vessel	at anchor on location	Back up	survey data
[Equipment as DOR 2905]					
				P. CASWELL	SURVEYOR
				D. LOVERING	- " -
				A. TERRILL	GEOPHYSICIST
				N. SMITH	ENGINEER
				H. CAMPGLI	GPS BASE OP
CONSUMABLES	1 1/2 EIS 1 SS 4 DISCS				
VEHICLE					
ACCOMMODATION					

AUTHORISED CONTRACT CHANGES/COMMENTS

PARTY CHIEF'S SIGNATURE

*P.A. Caswell*

CLIENT REPRESENTATIVES SIGNATURE

*[Signature]*

DOR

2912

CONTRACTOR ASSOCIATED SURVEYS INTERNATIONAL

## DAILY OPERATIONS REPORT (HYDRO)

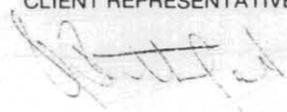
CLIENT SAGASCO		JOB NO. HY 8978		DATE 14/6/92	
LOCATION FLINDERS I - BASS STRAIT		VESSEL DERWENT ENTERPRISE			
FROM	TO	SUMMARY OF OPERATIONS			
0000	0500	Vessel at Anchor on flinders I site location			
0500		Heave up Anchor			
0540		Deploy side scan fish and run into line			
0552	0805	Running survey lines with EchoSounder + Side Scan Sonar			
0805	1005	GPS not usable due to operations by US operators			
0830	0845	Bow check vessel draft Deso 20 set to 2.99 M.			
1007		Commence run in to line F2.			
1030	1343	Running survey lines to end of GPS window.			
1405		Recover fish and anchor on location			
1915		Heave up anchor; liaison with base station - reach required on GPS receiver before corrections restored			
1950		Deploy side scan fish and run in to line complete 3 further lines - before GPS window finished			
2145	2155	Recover fish and anchor on location			
EQUIPMENT	NUMBER	EQUIPMENT	NUMBER	PERSONNEL	TITLE
2155	2215	Back up survey data to disc and sort analogue records.			
[Equipment no DOR 2905]				P. CASWELL	SURVEYOR
			O/B	D. LOVERING	- " -
			VESSEL	A. TERRILL	GEOPHYSICIST
				N. SMITH	ENG NEGR
				H. CAMPGLI	GPS BASE OP
CONSUMABLES	1x E/S 1x S/S 2x Discs				
VEHICLE					
ACCOMMODATION					

AUTHORISED CONTRACT CHANGES/COMMENTS

PARTY CHIEF'S SIGNATURE

P. Caswell

CLIENT REPRESENTATIVES SIGNATURE



DOR

2913

CONTRACTOR

ASSOCIATED SURVEYS INTERNATIONAL

263068

DAILY OPERATIONS REPORT (HYDRO)

CLIENT SAGASCO JOB NO. HY 8978 DATE 15/6/92

LOCATION FLINDERS 1 - BASS STRAIT VESSEL DERWENT ENTERPRISE

Table with columns: FROM, TO, SUMMARY OF OPERATIONS. Includes entries for vessel at anchor, monitoring DGPS corrections, heave up anchor, deploying fish, running survey lines, and recovering equipment.

EQUIPMENT NUMBER EQUIPMENT NUMBER PERSONNEL TITLE

Table listing equipment (2359 vessel) and personnel (P. CASWELL, D. LOVERING, A. TERRILL, N. SMITH, H. CAMPIGLI) with their respective titles.

CONSUMABLES 1 E/S 1 SS 3 DISC

VEHICLE

ACCOMMODATION

AUTHORISED CONTRACT CHANGES/COMMENTS

PARTY CHIEF'S SIGNATURE PA Couch

CLIENT REPRESENTATIVES SIGNATURE [Signature]

DOR 2914

**CONTRACTOR**

ASSOCIATED SURVEYS INTERNATIONAL

**DAILY OPERATIONS REPORT (HYDRO)**

CLIENT	SAGASCO	JOB NO.	HY 8978	DATE	16/6/92
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LOCATION	KING 1 - BASS STRAIT	VESSEL	DERWENT ENTERPRISE
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FROM	TO	SUMMARY OF OPERATIONS
0000	0300	Vessel continue passage to King 1
0130		Survey system running. Diff corrections good
0305	0320	Deploy Swath transducer and side scan fish
0328		Corrections off the air, contact Base Operator -
	0455	problem with GPS receiver, change with spare and restore corrections to vessel (0430 SWP DIP Vel 1500.17m/s)
0533		Commence first line abort due to problems with
	0710	vessel's Autopilot - Ship's Engineer investigating cause
0725	1003	Recommence survey lines and complete primary lines.
1010		Recover side scan fish and prepare drop cover.
1050		Core K-1 (fx 3013) 372821 E 5616659 N
1130		Core K-2 (fx 3016) 372841 E 5616685 N
1155		Redeploy side scan fish - problem with satellite antenna at base no corrections being received.

EQUIPMENT	NUMBER	EQUIPMENT	NUMBER	PERSONNEL	TITLE
1230		Recover fish and prepare acoustic transponders for deployment using GPS Stand Alone			
1352		Drop Transponder # 112	372236 E 5617393 N		
1413		Drop Transponder # 313	373418 E 5617199 N		
1415		Corrections restored from base station			
1432		Drop Transponder # 109	373416 E 5615993 N		
1453		Drop Transponder # 410	372188 E 5616131 N		
[CONTINUED ON DOR 2916]					

CONSUMABLES

VEHICLE

ACCOMMODATION

AUTHORISED CONTRACT CHANGES/COMMENTS

PARTY CHIEF'S SIGNATURE

P. Alwell

CLIENT REPRESENTATIVES SIGNATURE



DOR

2915

CONTRACTOR

ASSOCIATED SURVEYS INTERNATIONAL

263070

DAILY OPERATIONS REPORT (HYDRO)

CLIENT SAGASCO JOB NO. HY 8978 DATE 16/6/92 (CONT)

LOCATION KING 1 BASS STRAIT VESSEL DERWENT ENTERPRISE

Table with columns: FROM, TO, SUMMARY OF OPERATIONS. Contains handwritten entries for vessel operations from 1510 to 2150.

Table with columns: EQUIPMENT, NUMBER, EQUIPMENT, NUMBER, PERSONNEL, TITLE. Lists crew members: P. CASWELL (SURVEYOR), D. LOVERING, A. TERRILL (GEOPHYSICIST), N. SMITH (ENGINEER), H. CAMPIGLI (GPS BASE OP.).

CONSUMABLES 1x E/S 1.5/S 2x Discs

VEHICLE ACCOMMODATION

AUTHORISED CONTRACT CHANGES/COMMENTS

PARTY CHIEF'S SIGNATURE

PA Caswell

CLIENT REPRESENTATIVES SIGNATURE

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DOR

2916

CONTRACTOR ASSOCIATED SURVEYS INTERNATIONAL

## DAILY OPERATIONS REPORT (HYDRO)

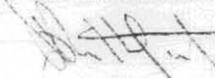
CLIENT SAGASCO		JOB NO. HY 8978		DATE 17/6/92	
LOCATION KING 1 - BASU STRAIT		VESSEL DERWENT ENTERPRISE			
FROM	TO	SUMMARY OF OPERATIONS			
0000	0310	Vessel at Anchor			
0310		Heave up Anchor - DGPS corrections good			
0320	0830	Deploy fish and commence survey lines at 0330			
0835	0845	Recover side scan fish and transducer mount			
0915		Redeploy transducer mount with sonar/dyne dunker attached			
0938	1000	Box in Compatt # 313 (PCRAW3.169)			
1036	1051	— " — " — # 410 (PCRAW4.169)			
1108	1123	— " — " — # 109 (PCRAW5.169)			
1131	1145	— " — " — # 313 (PCRAW6.169)			
1210		Vessel at anchor in centre of array. Processing calibration data			
1320		Recover transducer and deploy dunker alone to below vessel hull. Comparative DGPS/Acoustic fixes			
1420	1430	Velocity Dp (SVP16.5)			
EQUIPMENT	NUMBER	EQUIPMENT	NUMBER	PERSONNEL	TITLE
→	1600	Complete calibration calculations and wait for good DGPS for fix comparisons			
1800	1815	Take comparative DGPS/Acoustic fixes (logged to file PCRAW7.169). Systems agree to $\pm 5m$ , calibration acceptable.			
(CONTINUED ON DOR 2918)					
CONSUMABLES					
VEHICLE					
ACCOMMODATION					

AUTHORISED CONTRACT CHANGES/COMMENTS

PARTY CHIEF'S SIGNATURE

PA Russell

CLIENT REPRESENTATIVES SIGNATURE



DOR

2917



## CONTRACTOR

## DAILY OPERATIONS REPORT (HYDRO)

CLIENT	SHELL		JOB NO.	HY 8978		DATE	18/6/92		
LOCATION	WILD DOG 1		VESSEL	DERWENT ENTERPRISE					
FROM	TO	SUMMARY OF OPERATIONS (1½-2m long swell)							
0000	0100	Passage from Sagasco Block T/48 P							
0100		Enter shell Permit vic P/28							
0315		On location at Wild Dog 1							
0145		Survey system running - 12 Nm x 305° to location							
		DGPS corrections received ok.							
0325		Deploy Echosounder transducer							
0340	0400	Undertake velocity dip (SVP 16.6) water column 1498.07m/							
0400	0410	Bar check. Draft at 2.99m							
0415		Deploy side scan fish							
0439	1438	Running survey lines with Echosounder + side scan sonar							
0545		Break in lines due to unusable corrections from Base							
1450		station - interference to signal on 2 MHz							
	1510	Recover sidescan fish, stream drop core wire and prepare current meter for observations							
EQUIPMENT	NUMBER	EQUIPMENT	NUMBER	PERSONNEL	TITLE				
1520	2359	AT Anchor							
1545	1615	Current meter observations							
1820	1850	—	"	—	"	—			
2030	2100	—	"	—	"	—			
[Equipment as DOR 2905]				O/B VESSEL	P. CASWELL	SURVEYOR			
					D. LOVERING	— " —			
					A. TERRILL	GEOPHYSICIST			
					N. SMITH	ENGINEER			
CONSUMABLES	1 x E/S 1 x SS 3 x DISCS								
VEHICLE								H. CAMPAGLI	BASE OP.
ACCOMMODATION									

AUTHORISED CONTRACT CHANGES/COMMENTS

PARTY CHIEF'S SIGNATURE

P. A. Caswell

CLIENT REPRESENTATIVES SIGNATURE



DOR

2919

263074

CONTRACTOR ASSOCIATED SURVEYS INTERNATIONAL

## DAILY OPERATIONS REPORT (HYDRO)

CLIENT	SHELL	JOB NO.	HY 3978	DATE	19/6/92
LOCATION	WILD DOG 1	BASS STRAIT	VESSEL	DERWENT ENTERPRISE	

FROM	TO	SUMMARY OF OPERATIONS
0000	0530	Vessel at Anchor on location
0530	0600	Raise Anchor, run up survey system
0600	0725	Waiting on workable corrections from GPS Base station
0730		Deploy side scan fish
0747	1315	Running survey lines with Echo Sounder + side scan
1150	1250	Break in lines due problems with GPS receiver
1320	1340	Recover fish and proceed to Anchor until next GPS window. Routine maintenance on Echo-sounder and adjustments to side scan winch controls
1730	1745	Raise Anchor and deploy side scan fish
1801	1920	Survey lines - interrupted by bad GPS geometry at base station. DGPS corrections becoming poor
1920		Try alternative frequency for corrections - no improvement. Recover fish and proceed to Anchor

EQUIPMENT	NUMBER	EQUIPMENT	NUMBER	PERSONNEL	TITLE
2015	2359	Vessel at Anchor			
[EQUIPMENT AS DOR 2905]			O/B Vessel	P. CASWELL	SURVEYOR
				D. LOVERING	- " -
				A. TERRILL	GEO PHYSICIST
				N. SMITH	ENGINEER
				H. CAMPGLI	GPS BASE OP
CONSUMABLES	$\frac{1}{2} \times$ E/S $\frac{1}{2} \times$ SS 1 x Disc				
VEHICLE					
ACCOMMODATION					

AUTHORISED CONTRACT CHANGES/COMMENTS

PARTY CHIEF'S SIGNATURE

P. Caswell

CLIENT REPRESENTATIVES SIGNATURE



DOR

2920

Document No AS-HY-001(1)

263075

CONTRACTOR

ASSOCIATED SURVEYS INTERNATIONAL

## DAILY OPERATIONS REPORT (HYDRO)

CLIENT		SMELL		JOB NO.		HY 8978		DATE		20/6/92			
LOCATION				WILD DOG BASS STRAIT		VESSEL						DERWENT ENTERPRISE	
FROM	TO	SUMMARY OF OPERATIONS											
0800	0630	Vessel at Anchor											
0830	0715	Monitoring GPS corrections, improving gradually											
0730		Deploy side scan fish											
0755	1421	Running survey lines with Echo sounder + side scan											
1430	1500	Recover side scan fish and prepare for drop coring											
1506		Core C5 250332 E 5702838 N											
1531		Core C2 250399 E 5702837 N											
1629		Core C9 250205 E 5702875 N											
1649		Core 'Location' 250359 E 5702799 N											
1800		Core CB 250283 E 5702734 N											
1855		Core CA 250236 E 5702762 N											
1915		Vessel Anchor at Wild Dog location all drop core equipment secured.											

EQUIPMENT	NUMBER	EQUIPMENT	NUMBER	PERSONNEL	TITLE
[As DOR	2905]			P. CASWELL	SURVEYOR
			O/B	D LOVERING	- " -
			VESSEL	A TERRILL	GEOPHYSICIST
				N SMITH	ENGINEER
				H. CAMPIGLI	BASE OP.
CONSUMABLES	1 x E/S Roll	1 x SS Roll			
		2 x Discs			
VEHICLE					
ACCOMMODATION					

AUTHORISED CONTRACT CHANGES/COMMENTS

PARTY CHIEF'S SIGNATURE

P. Caswell

CLIENT REPRESENTATIVES SIGNATURE



DOR

2921

**CONTRACTOR** ASSOCIATED SURVEYS INTERNATIONAL

**DAILY OPERATIONS REPORT (HYDRO)**

CLIENT	SHELL	JOB NO.	HY 8978	DATE	21/6/92
LOCATION	WILD DUG BASS STRAIT		VESSEL	DORWENT ENTERPRISE	

FROM	TO	SUMMARY OF OPERATIONS
0000	0650	Vessel at Anchor
0600		Monitoring DGPS corrections - being received regularly
0650	0715	Heave up Anchor and prepare drop cover
0732		Core C3 250397 E 5702761 N
0803		Core C7 250427 E 5702724 N
0805		GPS system off the air due to U.S. operators -
	1000	vessel to Anchor to standby (Bar check sounder and recover transducer.)
1000		Raise Anchor 1005 Good GPS positioning restored
1043		Core C14 250021 E 5702313 N
1122		Core C16 249877 E 5703125 N
1229		Core C10 250710 E 5703293 N
1245		Core C12 250872 E 5702459 N
1300		Core C15 249824 E 5702566 N
1318		Core C17 250135 E 5703356 N

EQUIPMENT	NUMBER	EQUIPMENT	NUMBER	PERSONNEL	TITLE
		Core C11	250919 E 5703062 N		
		Core C13	250636 E 5702259 N		
		Core C6	250430 E 5702885 N		
		Core C16A	249863 E 5703136 N		
		Core C18	249853 E 5702757 N		

[continued on DOR 2922]

CONSUMABLES	
VEHICLE	
ACCOMMODATION	

AUTHORISED CONTRACT CHANGES/COMMENTS

PARTY CHIEF'S SIGNATURE <i>P Alwell</i>	CLIENT REPRESENTATIVES SIGNATURE <i>[Signature]</i>	DOR 2922
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CONTRACTOR

ASSOCIATED SURVEYS INTERNATIONAL

263077

DAILY OPERATIONS REPORT (HYDRO)

CLIENT SHELL JOB NO. HY 8978 DATE 2/6/92 (CONT)

LOCATION WILD DOG 1 VESSEL DERWENT ENTERPRISE

Table with columns FROM, TO, and SUMMARY OF OPERATIONS. Entries include times 1530, 1600, 1550-1700 and descriptions of equipment securing, contact with Base station, and data backup.

Table with columns EQUIPMENT, NUMBER, EQUIPMENT, NUMBER, PERSONNEL, and TITLE. Lists crew members P. CASWELL, D. LOVERING, A. TERRILL, N. SMITH, and H. CAMPAGLI with their respective titles and equipment details like [AS DOR 2905] and 2x DISCS.

AUTHORISED CONTRACT CHANGES/COMMENTS

PARTY CHIEF'S SIGNATURE: P.A. Caswell

CLIENT REPRESENTATIVES SIGNATURE: [Signature]

DOR 2923 Document No. AS-HY-001(1)

**APPENDIX D**

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Scope of Work

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**Appendix 1****ITEM 1****MARINE SITE SURVEY****1.0 INTRODUCTION**

Site Surveys in Permits T18/P, T/25P and VIC P/28 are to be performed prior to siting a Drilling Rig. This will require a detailed evaluation of the local seabed conditions.

The Contractor shall supply sufficient personnel, equipment and consumables for continuous operation and maintenance on a 12 hour per day basis to carry out the Scope of Work as outlined below. The Inviters would expect the Contractor to carry out survey operations for 12 hours per day during the majority of the survey, however, work outside this limit may be required at times.

**2.0 SCOPE OF WORK**

2.1 Mobilise equipment

2.2 Site Survey

2.2.1 Bathymetric survey

2.2.2 Side Scan Sonar Seafloor Mapping

2.2.3 Core sampling

2.3 Deploy and Calibrate Acoustic Transponder Network

2.4 Demobilise

2.5 Transport Core samples

2.6 Test Core samples

2.7 Produce Final Report

**3.0 SPECIFICATION**

3.1 GENERAL

3.1.1 Positioning - GPS

3.1.1.1 The Contractor shall provide a proven GPS system comprising Ashtech MXII receivers that operates in the real-time differential mode. The system is to consist of at least one GPS receiver

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onboard the Survey Vessel and another GPS receiver set up on a known reference point onshore.

3.1.1.2 Contractor must be able to show proof that the differential link proposed is capable of transmitting data over the distances likely to be encountered during this project.

3.1.1.3 The location of the reference station is to be approved by the Inviters' Representative prior to commencement of the survey. The station should have been included in the 1982 adjustment/least squares solution - GMS 1982 and have been included in the AGD 84 co-ordinate set to an order of 2 or above.

3.1.1.4 If the reference station has been established by any other method then details are to be provided, including copies of original field data.

3.1.1.5 Inviters will require the Contractor to connect the reference station into the National Co-ordinate Grid.

3.1.1.6 The method of obtaining WGS 84 reference co-ordinate for the reference station are also to be provided.

3.1.1.7 The differential data transmitted from the reference station to the survey vessel will be in the form of pseudo-range corrections. No block shift corrections to the GPS will be acceptable.

3.1.1.8 Data from the GPS system will be considered unacceptable if one or more of the following conditions are not met:

- . A minimum of 4 satellites to be tracked at any one time
- . GDOP, or equivalent, must be less than 5.0
- . PDOP, must be less than 5.0
- . Delta range Residuals less than 0.3 metres
- . Satellite elevation greater than 10 degrees

at which time the Inviters' Representative shall be notified and survey operations will cease. The vessel will be considered to be on "down time" until such time as the fault or situation is rectified.

3.1.1.9 The Inviter's Representative has the right to accept a lesser criteria than that specified in clause 3.1.1.8.

3.1.1.10 Differential data must be no older than 5 seconds when input into the Survey Vessel GPS receiver.

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- 3.1.1.11 Each satellite being tracked must receive differential pseudo-range corrections at least once every 5 seconds.
- 3.1.1.12 The Contractor shall obtain all necessary permissions for occupation of the Base Station site and licences for the operation of radios and the positioning equipment in the survey area.
- 3.1.1.13 As well as the above, the Contractor will carry a complete set of spares for the system or have the system 100% backed up.

### 3.1.2 ON-LINE NAVIGATION AND DATA LOGGING SYSTEM

Data recorded or dumped to a printer must include at least the following information whenever the system configuration is changed:

- . List of station co-ordinates (including height and delays)
- . Stations used in computation
- . Approximate location
- . Datums, projections, spheroids used in calculations
- . Offset parameters for GPS antenna, echosounder transducer, sidescan towfish used on the survey vessel.

### 3.1.3 CO-ORDINATE SYSTEM

- 3.1.3.1 All survey calculations shall be carried out on the Australian National Spheroid, using the Australian Geodetic Datum 1984. Co-ordinates shall be supplied on the Australian Map Grid using a standard Central Meridian of 147 degrees East.
- 3.1.3.2 The Contractor shall supply the transformation parameters to convert from WGS 84 to AGD 84. The Inviters may accept these parameters or supply its own, which the Contractor will adopt and use.

### 3.1.4 TIDES AND DATUM

- 3.1.4.1 The Contractor will provide tidal constituents for the survey area from which the Contractor shall derive tidal corrections. The Inviters may accept these parameters or supply its own, which the Contractor will adopt and use.
- 3.1.4.2 The datum to be adopted will be Lowest Astronomical Tide.

### 3.1.5 CONSUMABLES

The Contractor shall supply all consumables which may be required for the performance of the Work. No consumables

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shall be rechargeable to Inviters other than for drop cores.

### 3.1.6 DOWN TIME

- 3.1.6.1 At the start of survey for each site, if requested, up to 1 hour will be allowed to tune underwater recording equipment to achieve the best possible data records.
- 3.1.6.2 At the start of each days work, all necessary underwater recording equipment is to be deployed and made ready for use. A period of one hour shall be allowed for deploying and making ready such equipment.
- 3.1.6.3 Any period exceeding the allocated one hour required to complete either of the two above mentioned tasks will be considered "down time".
- 3.1.6.4 Any loss of production time exceeding one hour caused by a malfunction of equipment which is not directly attributable to an external source shall be considered "down time".

### 3.1.7 SAFETY

At all times, the Contractor shall observe safe working conditions and practices for all its personnel. Contractor's personnel shall take all necessary precautions and wear such safety clothing and equipment to prevent the likelihood of accident to personnel and property.

A safety meeting shall be held prior to leaving Port for the first site. Any items arising from this meeting shall be resolved to the satisfaction of all parties prior to departure.

### 3.2 MOBILISATION

- 3.2.1 A complete list of spares and backup equipment for all survey equipment required under the Contract and carried on board the survey vessel shall be made available to the Inviters' Representative prior to departing Port for the first site.
- 3.2.2 Evidence of permissions for the occupation of sites for the GPS Base Station and Radio Licences required for operation of the differential GPS link and voice communications shall be sighted by the Inviters' Representative prior to departing Port for the first site.
- 3.2.3 Mobilisation shall include sufficient tests to warrant that all computers, software, sensors, cabling and associated equipment is fully functional and operating according to the Manufacturers specifications.

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- 3.2.4 Mobilisation of equipment and personnel shall be deemed to be completed the day the vessel commences the survey of the first line at the first site with all equipment onboard the Survey Vessel and all presurvey tests completed to the satisfaction of the Inviters' Representative.

### 3.3 SITE SURVEYS

#### 3.3.1 General

Sites to be surveyed are to be a maximum three kilometres square with the proposed drilling location at the centre of the site. The orientation of the primary survey lines will be specified by the client prior to commencement of work. Primary lines are to be spaced evenly at 100 metre intervals across the site and oriented according to the direction specified such that one line passes through the proposed location. Cross tie lines are to be surveyed at right angles to the primary lines. An even spacing at 250 metres (except where required at 100 metres) across the site is to be used for the tie lines with one line passing through the proposed drilling location.

#### 3.3.2 BATHYMETRY

- 3.3.2.1 Continuous seabed profiling shall be obtained along all survey lines using a vessel mounted precision Echo Sounder. Water depths on site are between zero and 135 metres and the reduced bathymetric sounding shall be to an accuracy of not less than  $\pm 0.3$  metres. Depth data shall be acquired digitally, logged and computer processed. The analogue records, however, shall be considered original data records of equal importance.
- 3.3.2.2 The analogue depth scale in use must permit scaling of soundings to a discrimination of  $\pm 0.1$ m.
- 3.3.2.3 Paper transport speed is to be adjusted such that event fix marks appear on the analogue trace no closer than two (2) centimetres apart when boat is travelling at survey speed.
- 3.3.2.4 Each event mark must show the event number, line number and time of event.
- 3.3.2.5 At the start of each new line, the analogue record shall be annotated with the site name, line direction, range scales, date as a minimum.
- 3.3.2.6 The use of a hull-mounted transducer is preferred.
- 3.3.2.7 Digitised depths shall be logged in suitable format for off-line

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processing.

- 3.3.2.8 The vertical depth of the echosounder transducer below the sea level is to be measured daily and entered into the echosounder draught setting where possible. Should bar checks be used for calibration then the transducer draught shall be checked by comparison taken with the bar less than 3 metres below the transducer.
- 3.3.2.9 The speed of sound in sea water is to be computed from temperature/salinity measurements or preferably directly by velocity meter. Sufficient cable is to be provided such that readings can be taken from water surface to seabed at 10 metre intervals. If a depth sensor is not fitted, corrections for the angle of a streaming shall be made. A certificate of recent laboratory calibration shall be provided with the T/S Probe or Velocimeter. If using a temperature/salinity probe then standard water samples and a certified thermometer shall be carried onboard. The acoustic velocity is to be computed using the formula of Chen and Millero (UNESCO 1983) or equivalent.
- 3.3.2.10 Bar checks and/or temperature salinity dips are to be carried out daily or as directed by the Inviters' Representative onboard.
- 3.3.2.11 Undigitised depths will only be accepted at the discretion of the Inviters' Representative.
- 3.3.2.12 The analogue record generated whilst mapping will be used for interpretation and recorder nettings are to be kept adjusted to provide a clear trace with good contrast.
- 3.3.2.13 No survey operations shall be carried out in weather or sea conditions that degrade the recorded data to an extent that the objectives of the survey are not met. This criteria shall be established from inspection of the analogue trace taking into consideration such factors as the amount of swell present as well as the shape of the sea bed.
- 3.3.2.14 The Inviters' Representative shall advise the Contractor to cease survey operations if in his opinion the quality of data being gathered is unsatisfactory

### 3.3.3 SIDE SCAN SONAR

- 3.3.3.1 A multi channel dual frequency sea floor mapping system is to be provided.

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- 3.3.3.2 The side scan sonar recorder shall be run on the 125 metre range for all primary line providing overlap along the survey lines.
- 3.3.3.3 The side scan sonar recorder shall be run on the 250 metre range for all tie lines of 250 metre spacing providing overlap along the survey lines. Where tie line spacing is 100 metres, the side scan sonar recorder shall be run on the 125 metre range.
- 3.3.3.4 The system used should be capable of rectified true-to-scale plan representation of the sea floor as the analogue output.
- 3.3.3.5 The transducers are to operate at 100 kHz or 500 kHz frequencies. The frequency chosen shall depend on sea bed conditions.
- 3.3.3.6 The analogue record generated whilst mapping will be used for primary interpretation and recorder settings are to be kept adjusted to provide a clear trace with good contrast.
- 3.3.3.7 No survey operations shall be carried out in wether or sea conditions that degrade the recorded data to an extent that the objectives of the survey are not met. This criteria shall be established from inspection of the analogue trace taking into consideration such factors as the amount of swell present as well a the shape of the sea bed.
- 3.3.3.8 The Inviters' Representative shall advise the Contractor to cease survey operations if in his opinion the quality of data being gathered is unsatisfactory.
- 3.3.3.9 The recorded data shall be interpreted and processed to provide maximum information on the boundaries of seabed materials, their inferred composition, and the mapping of areas of seabed relief.
- 3.3.3.10 The Inviters' shall be advised of any areas in which the sea floor features are of sufficient significance, or are of a nature that might require further investigation. Inviters will instruct which, if any, areas to be so covered.
- 3.3.3.11 The side scan sonar towfish is to be flown at a height above the seabed of 10% of the recording scale.
- 3.3.3.12 Paper transport speed is to be adjusted such that event fix marks appear on the analogue trace no closer than five (5) centimetres apart when the boat is travelling at survey speed.

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- 3.3.3.13 Each event mark must show the event number, line number and time of event.
- 3.3.3.14 At the start of each new line, the analogue record shall be annotated with the site name, line direction, range scales, date as a minimum.

### 3.3.4 SEABED CORING

- 3.3.4.1 The principal requirement of the seabed coring is to obtain a sufficient quantity of suitable sub seabed samples for laboratory testing and logging purposes. Results from this exercise will be used in order to provide information to assist in determining site conditions at the proposed drilling location and/or anchor holding capabilities.
- 3.3.4.2 A minimum of two gravity drop cores and maximum of seventeen gravity drop cores are to be taken at each location. The Inviters' Representative may vary the coring program by adding or reducing the number of locations required to be cored depending on the type of material encountered.
- 3.3.4.3 Drop Coring will usually be carried out at the completion of data gathering using the underwater equipment. A such time, the underwater equipment will be retrieved, secured and cleared to allow drop coring to proceed without the likelihood of damage to the underwater equipment. A period of one hour will be allowed to retrieve and secure the underwater equipment and prepare the drop coring equipment for use. Time in excess of the allocated one hour will be considered "down time".
- 3.3.4.4 Cores will be obtained by dropping the drop corer from at least ten (10) metres but no greater than fifteen (15) above the sea floor. The height will be determined from the echo sounder reading taken at the core location. Accurate markings placed on the winch cable will be provided to ensure that the drop core is dropped from the correct height.
- 3.3.4.5 The core barrel length will be determined by onsite conditions so as to yield the maximum core length.
- 3.3.4.6 The Contractor shall immediately upon retrieval of a sample to the surface afford the Inviter' Representative the opportunity to inspect such sample. The samples shall then be suitably packaged to prevent sample disturbance and moisture loss during storage on board the vessel and transportation to the nominated testing laboratory.

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- 3.3.4.7 All core samples shall be transported by the Contractor to the Soil Testing Laboratory as nominated by the Inviters. The Contractor shall be responsible for the care and custody of all core samples from the time the core sample is obtained from the seabed until the time of the core sample arrives at the Soils Laboratory.
- 3.3.4.8 Laboratory analysis of selected soil samples is to be undertaken (by others), on the cores taken as a part of the survey. The Laboratory analysis report of core samples shall be included in the relevant Final Report.
- 3.3.4.9 The Contractor shall satisfy Inviters' prior to the commencement of this exercise that the procedures proposed for the use of the seabed coring equipment will provide suitable results in the seabed materials expected on this site.
- 3.3.4.10 The Contractor shall keep as part of this daily record the following items particularly relating to the seabed coring:
- a) Type of equipment used.
  - b) Location of core and level of seabed surface with respect to LAT.
  - c) Core number.
  - d) Length of core retrieved.
  - e) Remarks on breakdown, delays, difficulties, etc.
  - f) Consumables used.
- 3.3.4.11 The Contractor shall provide all consumables for the expected number of core samples expected to be taken. The Contractor shall have available on standby for immediate transportation, all necessary equipment and consumable for additional core samples.

### 3.3.5 ACOUSTIC TRANSPONDER NETWORK

- 3.3.5.1 The Contractor shall provide a Sonardyne Acoustic navigation system consisting of the following:
- . Four (4) medium frequency Compatt Transponders
  - . One (1) Portable Acoustic Navigator (PAN)
  - . One (1) towable acoustic transducer
  - . Cables
  - . Software
  - . Interfacing
  - . Concrete Weights
  - . Flotation collars

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Chain, shackles, wire, rope  
and other necessary consumables.

As well as the above, the Contractor will carry a complete set of spares for the system or have the system 100% backed up.

3.3.5.2 A network comprising four (4) transponders is to be deployed and calibrated at the King 1 location.

3.3.5.3 The Acoustic net will be designed from the proposed anchor pattern provided by SAGASCO (Item 2) to ensure that the transponders will be clear of all anchor chains and within 1000 metres of the proposed drilling location.

3.3.5.4 Prior to deployment, all transponders shall be bench and wet tested and proved operational. Connecting rope strops between the concrete weights and shall be uniform in length for each site and of sufficient length to allow sea bed ranging between transponders.

3.3.5.6 Calibration of the network will be carried out in two phases.

3.3.5.7 **Relative Calibration**

A Relative Calibration of the network will be performed by measuring in both directions, sea bed ranges between all combinations of transponders. From this, the relative geometry of the network will be determined.

3.3.5.8 **Absolute Calibration**

An Absolute Calibration of the transponder network will be performed to assign AGD 84 co-ordinate values to transponder positions. This will be achieved through simultaneous observation of differentially corrected GPS position and an Acoustic position derived from slope ranges to seabed transponders. Data will be gathered in this way from positions covering the whole of the area enclosed by the transponder network. "Boxin" of two transponders will be required to prove the calibration.

3.3.5.9 At the completion of the calibration, position data will be observed simultaneously from the DGPS and Acoustic systems. The difference in position between systems should not exceed five (5) metres.

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### 3.3.6 PROCESSING AND REPORTING

- 3.3.6.1 A simple and efficient system shall be established for the annotation and correlation of all the records as they are acquired.
- 3.3.6.2 A preliminary field report for each site surveyed shall be provided within 48 hours of the completion of the field work.
- 3.3.6.3 All final drawings are to be A1 size on stable plastic with standard title blocks. Inviters may require the inclusion of Inviters' drawing number and title block on the finished drawings.
- 3.3.6.4 The final report is to include but not be limited to the following topics:
- . Scope of Works
  - . Field Procedure and Equipment Utilised
  - . Calibration Results
  - . Summary of Results
  - . Comprehensive Discussion of Results, referring to examples of data where necessary
  - . Summary of Events
  - . All Field Log Sheets and Daily Reports
  - . Drawings
- 3.3.6.5 Separate charts for Bathymetry and Sea Bed Materials shall be produced for each site at a scale of 1:5000. Locations and descriptions of all gravity cores are also to be shown on the Sea Bed Materials Chart. Both charts shall be included in the Final Report for each site.
- 3.3.6.7 The Contractor is to submit the proposed report format prior to completion of the field work.
- 3.3.6.8 The Contractor shall issue the final report within 14 days of completion of field work.
- 3.3.6.9 The Contractor shall provide a daily report throughout the field work detailing work achievement, details of weather and seastate, equipment deployed, personnel, breakdowns or other items of relevance, which will be signed daily by the Inviters' Representative and the Contractors Party Chief, each shall keep a copy.

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### 3.3.7 DEMOBILISATION

Demobilisation of equipment and personnel shall commence from the time of departure from the Area of Operation. Demobilisation of equipment and personnel will be complete upon arrival of all such equipment and personnel at the designated home base.

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**Appendix 1****ITEM 2**

1.0 Additional Details of required work - SAGASCO.

1.1 The work will be performed with a surface positional tolerance of +/- 5m:

**King 1**

Line HB77A-306 SP300,39°35'24.44"S 145° 31' 08.80"E 372836 5616671

Echo sounding and simultaneous side scan survey over a 3km x 3km square area with primary lines at a 100m spacing orientated at a bearing of 160° and tie lines at up to a 250m spacing.

Two drop cores will be taken within a 15m radius of the proposed location.

Four acoustic transponders will be deployed in accordance with Section 3.3.5 and the attached proposed anchor pattern.

**Flinders 1**

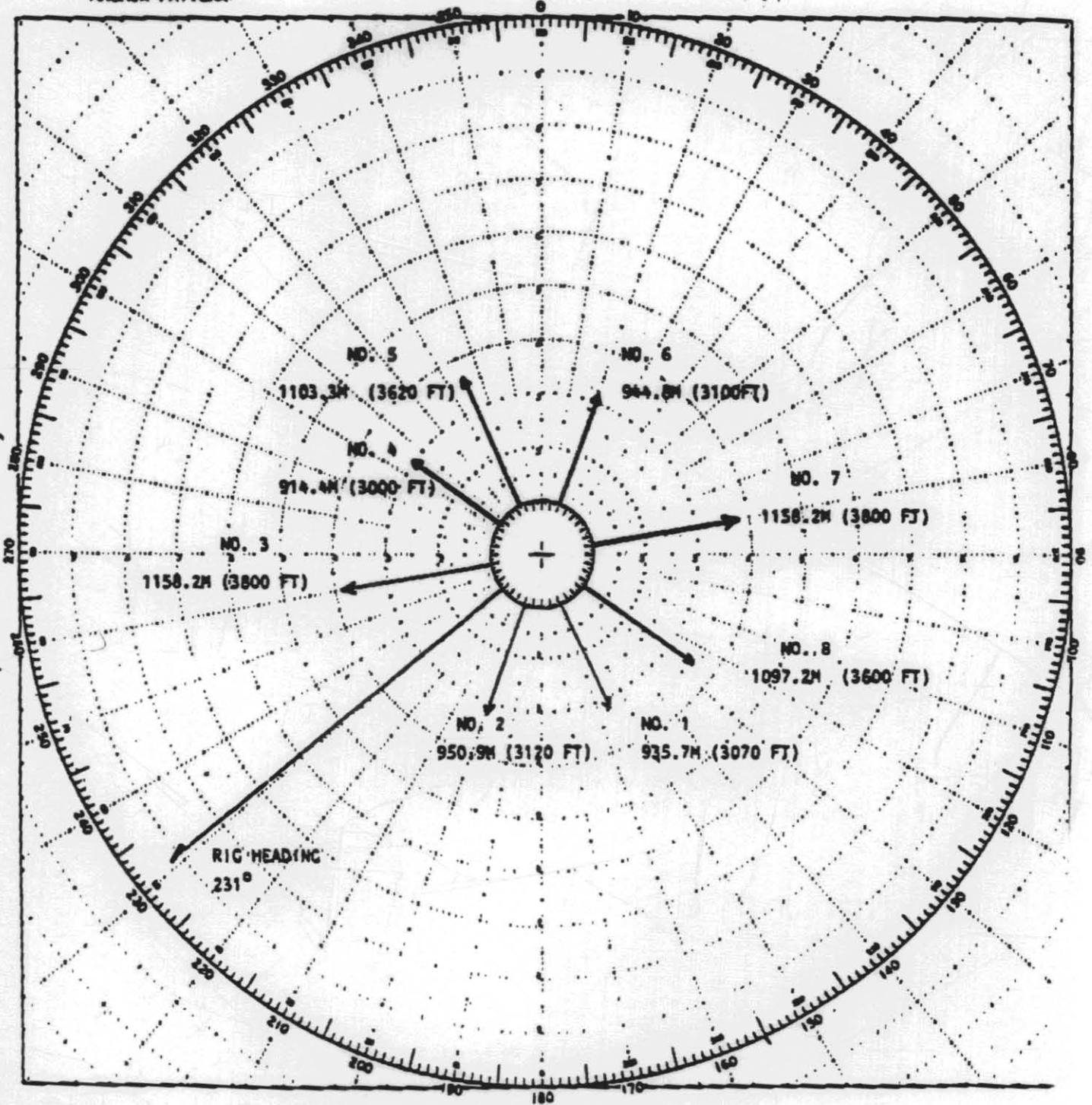
Line TNK4-79 SP900,40°22'51.83"S 145° 40'18.70"E 387261 5529085

Echo sounding and simultaneous side scan survey over a 3km x 3km square area with primary lines orientated at a bearing of 160°.

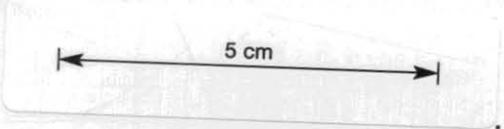
Two drop cores will be taken within a 15m radius of the proposed location.

# PROPOSED ANCHOR PATTERN FOR 263092 OCEAN EPOCH - BASS STRAIT

ANCHOR PATTERN



water depth = 70 - 80 m



M HELL EPO8

# APPENDIX 2

263093

## SPECIFICATION FOR WILD DOG 1 SITE SURVEY

### SCHEDULE

#### ITEM 1. AREA OF OPERATION

(maps attached)

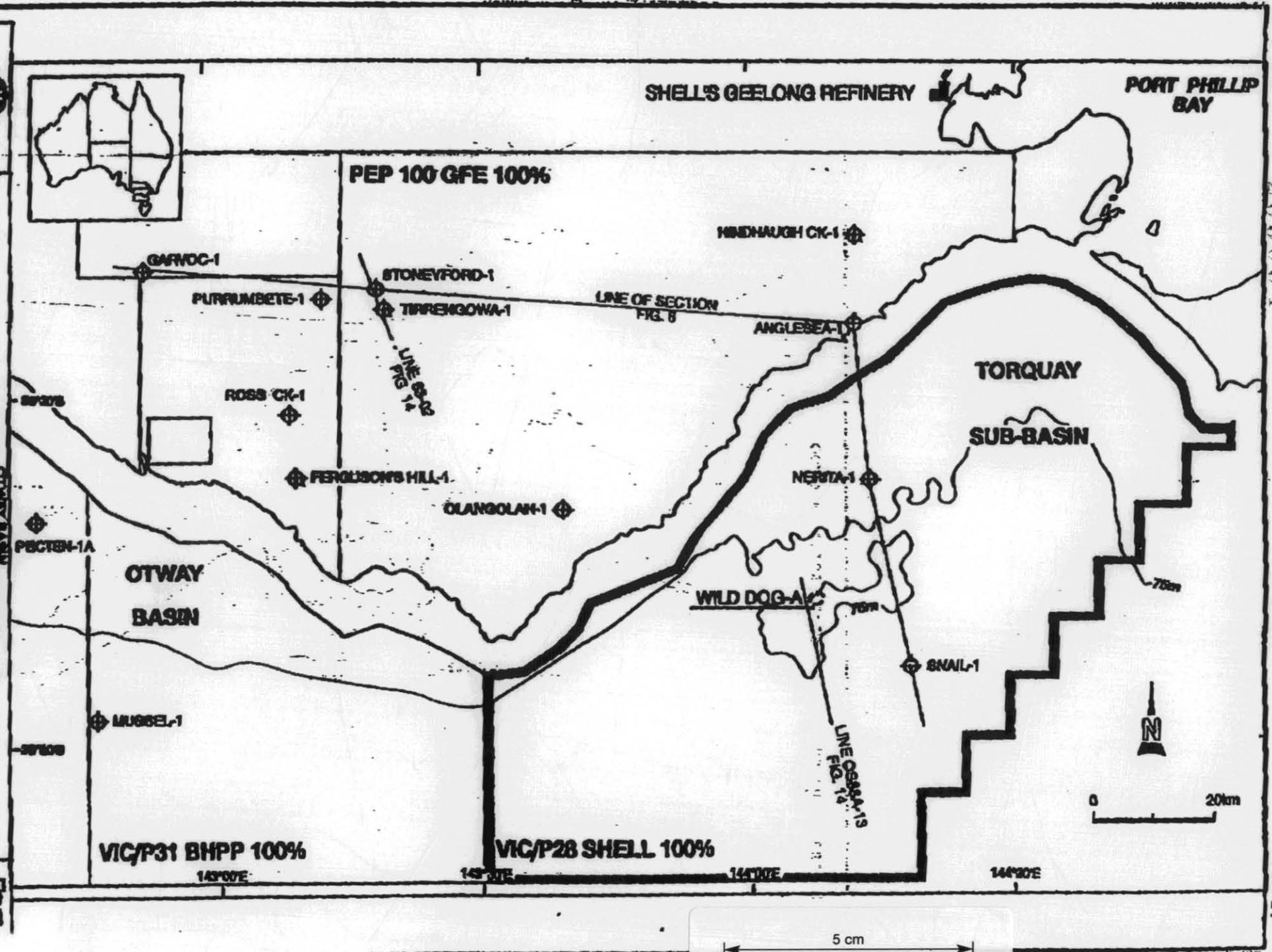
The survey shall be conducted within a square shaped area of dimensions 2km x 2km. The survey lines from the corners of the survey area shall intersect at the well location:

038° 47' 17.2" South

144° 07' 33.3" East

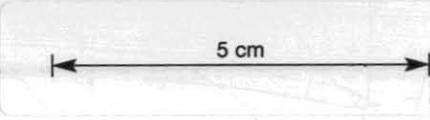
Surface positional tolerance ± 5 metres

Refer App. 1: Wild Dog 1 Location Map  
App. 2: Site Survey Plan - Wild Dog 1.



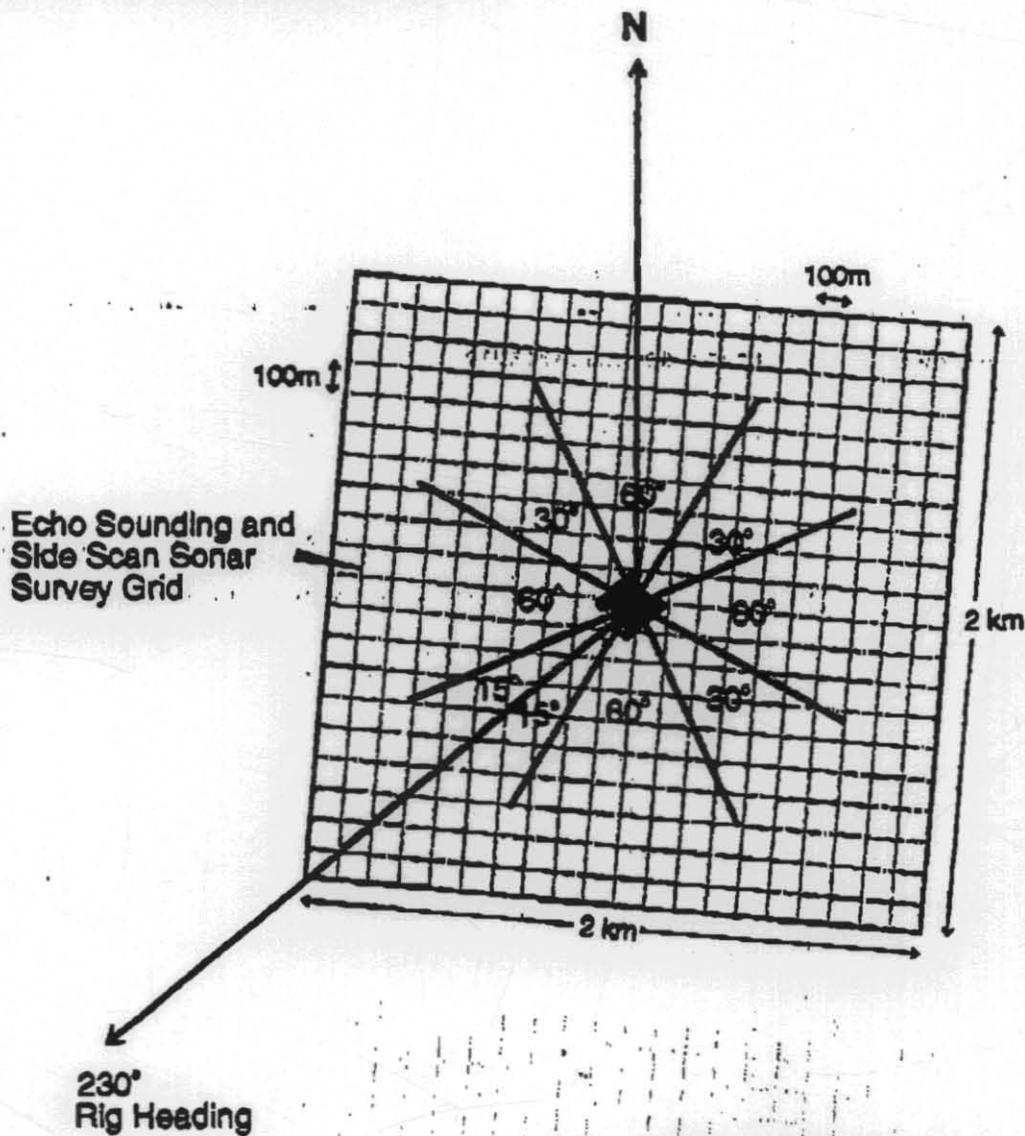
SHELL AUSTRALIA  
 P.M. 08.1.04  
 Author: EXO  
 Report No. SDA 590  
 Date: NOVEMBER 1991  
 Drawing No. 27499  
**LOCATION MAP**  
 Figure 1

ITEM 1. APP. 1. - Wild Dog Location.



**POSITION :** LAT 38° 47' 17.2" S  
LONG 144° 07' 33.3" E

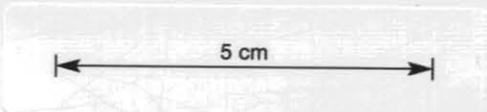
**POSITIONAL TOLERANCE :** ± 5 Metres



**SITE SURVEY REQUIREMENTS**

- (i) 2 km x 2 km Echo Sounding + Side Scan Sonar  
100m grid pattern centred on well location as diagram  
(42 passes x 2 km = 84 km surveyed)
- (ii) Gravity ("Drop") Cores
  - (a) at well location
  - (b) 50m from well location on headings  
060°, 140°, 230° and 320°
  - (c) 100m from well location on headings as (b)
  - (d) 600m from well location on headings 035°,  
065°, 125°, 155°, 215°, 245°, 305° and 335°

<p>SHELL AUSTRALIA E &amp; P OIL &amp; GAS</p>	TORQUAY SUB BASIN			Appendix 2 Item 1
	<b>WILD DOG-1 SITE LOCATION</b>			
Author: EEO/1	Report No.:	Date: JUNE 1992	Drawing No.: 87056 C	





263097

**ITEM 2. SERVICES TO BE RENDERED BY THE CONTRACTOR**

The following services ("the Services") shall be performed by the Contractor for the Wild Dog 1 location:

**Mobilisation of Equipment, Materials and Personnel**

All equipment required in the performance of the Services will be fitted to the vessel, all shore stations shall be erected, and all equipment checked and calibrated before commencing the site survey. Preparation for the services (equipment fitting and testing) will take place in Melbourne.

The survey of the Wild Dog 1 location will take place after the Sagasco surveys of King 1 and Flinders 1 locations.

**Site Survey**

The site survey shall include the following:

- a) moving of the marine vessel, with all necessary personnel on board and site survey equipment installed to the site or sites of the survey as specified in Item 1 of this Agreement.
- b) performance of an echo sounding survey across the specified site in a grid at 100 metre intervals as per App 2, Item 1. Positional uncertainty for any point of the survey shall be restricted to a maximum of 5 metres. A total of 42 passes over the area will be made in the grid.
- c) performance of a side-scan sonar survey along the same lines and simultaneously with the echo sounding survey.
- d) the sampling of seabed sediments by the use of drop-core equipment as specified below:
  - 1) at the well location. This core to be repeated if necessary until successful.
  - 2) 50 metres from the well location on the following bearings, 050°, 140°, 230° and 320°.
  - 3) 100 metres from the well location on the same bearings as 2).
  - 4) 600 metres from the well location on bearings 035°, 065°, 125°, 155°, 215°, 245°, 305° and 335° (approximate anchor positions).

A total of 17 samples will be taken. Each sample will be bagged, clearly marked and stored for subsequent

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analysis. The core taken at the well location will be repeated until successful as necessary.

- e) moving of the marine vessel, all equipment and personnel for demobilisation.

#### Demobilisation of Equipment and Personnel

All equipment, materials and personnel used in the site survey will be demobilised from Melbourne.

#### Detailed Report

The Contractor shall provide, within two weeks of the completion of the site survey, a report which shall include details of the following:

- Scope of work.
- Equipment used.
- Survey positional control and calibration.
- Analysis and presentation of data (including bathymetric maps, sidescan sonar interpretation, analysis of seabed sediments).
- Daily operations and time breakdown.

#### Additional Services

Make measurements of the current at the Wild Dog 1 location at the time of the site survey using the direct reading current meter.  
Current to be measured at a range of depths from seabed to surface.